The British Power Conversion Company

HP-300 SERIES

UNINTERRUPTIBLE POWER SUPPLIES

HP-340P	40 kVA
HP-350P	50 kVA
HP-360P	60 kVA
HP-380P	80 kVA
HP-3100P	100 kVA
HP-3120P	120 kVA
HP-3150P	150 kVA
HP-3160P	160 kVA
HP-3200P	200 kVA

USER MANUAL

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SAFETY

This manual contains important instructions for HP-300 series UPS that should be followed during installation and maintenance.

IMPORTANT NOTICES

1. Read instructions carefully before operating the UPS
2. All warnings in the manual should be adhered to.
3. All operating instructions should be followed.
4. The unit should be supplied by a grounded outlet. Do not operate the unit without ground source.
5. Power cord of the UPS should be routed carefully so that they are not to be walked on.
6. Please save this manual.
7. Please save or recycle the packaging materials.

WARNING !

- Do not insert any object into ventilation holes or other openings.
- To reduce the risk of fire or electric shock, install in temperature and humidity controlled indoor area free of conductive contaminants.
- To reduce the risk of fire, replace fuses with the same type and rating when necessary.

CAUTION !

- **Only qualified personnel should install or service UPS/batteries.**
- **Risk of electric shock, do not remove cover. No user serviceable parts inside, refer servicing to qualified service personnel.**
- The output may be energized when the unit is not connected to a mains supply.
- **Risk of electric shock hazardous live parts inside this unit are energized from the battery supply even when the input AC power is connected.**
- Turn OFF the UPS before installing a computer interface signal cable. Reconnect the power cord only after signaling interconnections have been made.

ABOUT THE BATTERY

- A battery can present a risk of electric shock or burn from high short circuit currents. The following precaution should be observed when working on batteries :
  * Remove watches, rings or other metal objects.
  * Use tools with insulated handles.
- The batteries in this UPS are recyclable. Batteries must be disposed of according to local environmental laws. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly.
- Do not dispose of batteries in a fire. The batteries will explode. Do not open or mutilate the batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes. If electrolyte comes into contact with the skin the affected area should be washed immediately.
- The energy source (the battery) cannot be de-energized by the user.

I. GENERAL DESCRIPTION

1.1 Introduction

HP-300 Uninterruptible Power Supplies, are On-Line UPS's, being manufactured with the state-of-the art PWM and IGBT technology, produce microprocessor controlled pure sine wave output to critical loads. HP-300 series UPS's install between the critical load and the mains.

The advantages of using UPS:

- Power blackout protection:
  If the mains power fails, the UPS continues to power the critical load from its battery source, leaving the load immune from power disturbances.
- Increased power quality:
  The UPS has its own internal voltage and frequency regulator circuits, which ensure that its output is maintained within close tolerances independent of voltage and frequency variations on the mains power lines.
- Increased noise rejection:
  By rectifying the input AC power to DC power, and then converting it back to AC, any electrical noise present on the input mains supply line is effectively isolated from the UPS output, therefore the critical load sees only clean power.

Features :

- Parallel mode operation (optional) up to 2 UPS. (1 redundant)
- **On-line** technology with pure **sine wave** output.
- PWM and IGBT technology.
- **3 Microprocessors at each UPS**
- **Microprocessor controlled main controller board.**
- **Microprocessor controlled rectifier board.**
- **Microprocessor controlled parallel control board.**
- **Static (STS) and maintenance by-pass.**
- LCD (Liquid Crystal Display) display.
- **Alarm history (Memory for max. 64 alarms.)**
- **High quality maintenance-free lead-acid type batteries.**
- **High nonlinear load capacity, special for computers.**
- Automatic and Manual Battery Test System:
  After all the pre conditions ensured, the battery test is made periodically by itself.
- Interactive battery management system (optional)
- Nonlinear loads driving capability.
- Facility of connection with the PC:
  In case of failure, alarms of the UPS (Battery low, mains control or general) is shown by the dry relay contacts and RS232, to the user. The relay interfaces are specially produced for the server systems (IBM AS400 and Microsoft Windows NT).
- Accessories:
  - **Optional UPS monitoring software (RUPS ®, RUPSII® , UPSILON ®) SNMP devices, compatible to any operating system.**
  - Remote Monitoring Panel (RMP) available: You can observe the UPS status and parameters without using a computer at a remote location up to 200 meters away (via RS485 interface). Up to 5 remote monitoring panel connection is possible.
  - UPS Port Sharer up to 24 server is available

1.2 Design Concept

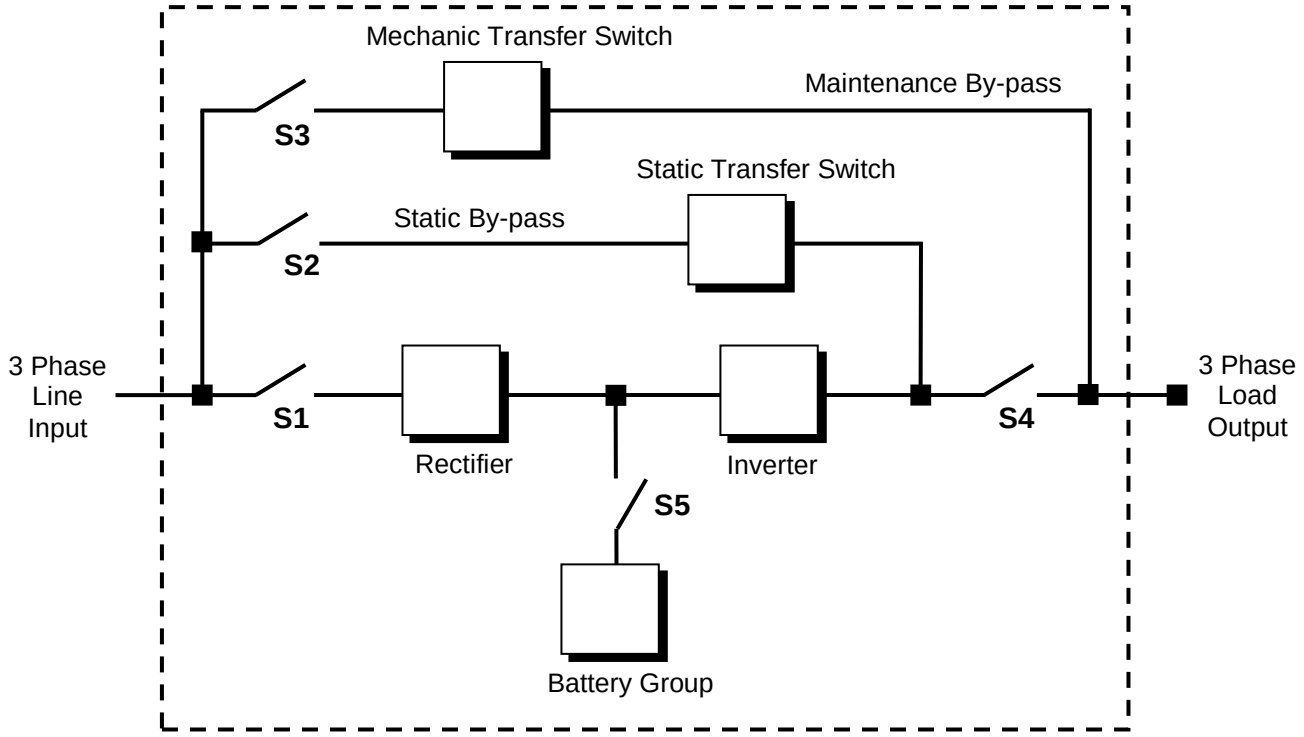


Figure 1-1 Block Diagram

S1	: Inverter input power switch
S2	: Static by-pass input power switch
S3	: Maintenance by-pass power switch
S4	: UPS power out switch
S5	: Battery circuit breaker (optional)
S6	: Static By-Pass control switch (Figure 1.3.a-b-c)

RECTIFIER: The first conversion stage (from AC to DC) uses a 3 phase, fully controlled rectifier to convert the incoming mains supply into a regulated DC BUS BAR. The DC BUS BAR produced by the rectifier provides both battery charging power and power to the inverter section.

BATTERY GROUP: It keeps as an reserve DC power supply, for the inverter in case of mains failure.

INVERTER: It is made by utilizing the latest technology of power transistor (IGBT) and pulse width modulation (PWM). Inverter converts dc bus voltage into (second conversion) an alternative voltage like line voltage. And provides this voltage and frequency being fixed.

STATIC TRANSFER SWITCH (STATIC BY-PASS): Two types of bypass circuitry is available for HP-300 series UPS

- Full static switch for parallel systems
- Half static switch for normal UPS

The circuit block annotated contains an electronically controlled switching circuit, which enables the critical load to be connected either to inverter output or to a by-pass power source via the" static by-pass line". Normally at standart models, the load is connected to the inverter via a contactor K1 (controlled by the static switch circuits); but in the event of a UPS overload, or inverter failure, it is automatically transferred to the static by-pass line.

In parallel systems the second static switch is builded ,from inverter output ,to load.

MECHANIC TRANSFER SWITCH (MAINTENANCE BY-PASS): A second, manually controlled, ”maintenance by-pass” supply is also incorporated into the UPS design. Its purpose is to enable the critical load to be powered from the mains (by-pass) supply while the UPS is shut down for maintenance or troubleshooting. The load is unprotected against mains power supply aberrations or failure when it is connected to either the static by-pass or maintenance by-pass supply.

BATTERY CIRCUIT BREAKER: There is a fuse loadbreak switch (externally mounted) between the UPS and the batteries. The battery is connected to the DC BUS BAR through a fuse loadbreak switch . This switch has two built-in fuses (one for battery plus, and one for battery minus). This circuit breaker is closed manually.
Also **electronic controlled battery circuit breaker** (optional) available. This circuit breaker is closed manually but it contains an under voltage release coil which enables it to be tripped from the UPS control electronics following certain detected faults. It also has a magnetic trip facility for overload protection.

BATTERY GROUP (CABINET): The batteries associated with the UPS are generally housed in a purpose-built cabinet located along-side the main UPS equipment. For a long-term efficiency from the batteries, keep them in room temperature (20°C).

1.2.1 The Operating Modes of UPS

A. **Normal Operation (If there is a mains supply) :** All relevant power isolators and circuit Breakers Closed (except mechanical bypass circuit breaker), the load is powered by the UPS. Also during the normal operation battery charges. This is made by the UPS’s rectifier.

B. **Battery operation:**
During this operation Inverter part of the UPS is converting DC power (from battery group) to AC power ,and feeding the load. Critical load works till the batteries are being empty. At the end of discharge UPS gives **”A7 BATTERY LOW”** alarm.If the batteries are fully discharged UPS gives **“A5 BAT.AUT END”** message and shutdown. When the mains is restored the UPS returns back to normal operation.

NOTE: The battery circuit breaker must be turn to “1” position when the mains is restored. If not in a second main failure the critical load will be without Voltage.

C. **On maintenance by-pass:** UPS shutdown but the load connected to the unprotected mains via the maintenance by-pass supply line.

D. **Parallel operation :** (optional, need special hardware) At least 2 UPS’s are installed to system for increasing security and redundancy, they operates together and interactive.

1.2.2 The Power Configuration of UPS

The power switch location of the HP-300 series UPS’s are shown in the figures 1.1-2-3 In the figure 1.2 external (split) by-pass block diagram is given. Optionally the static and mechanic by-pass line can be connect to a different 3 phase AC source (other UPS etc.),and the rectifier input is connected to generator or mains voltage. If there is no other power supply static and mechanic by-pass line input (S2) and the rectifier input connections will be connect to each other. (See figure 1.1)
During the normal operation except the maintenance by-pass switch, all the Switches will be at “1-On” position.

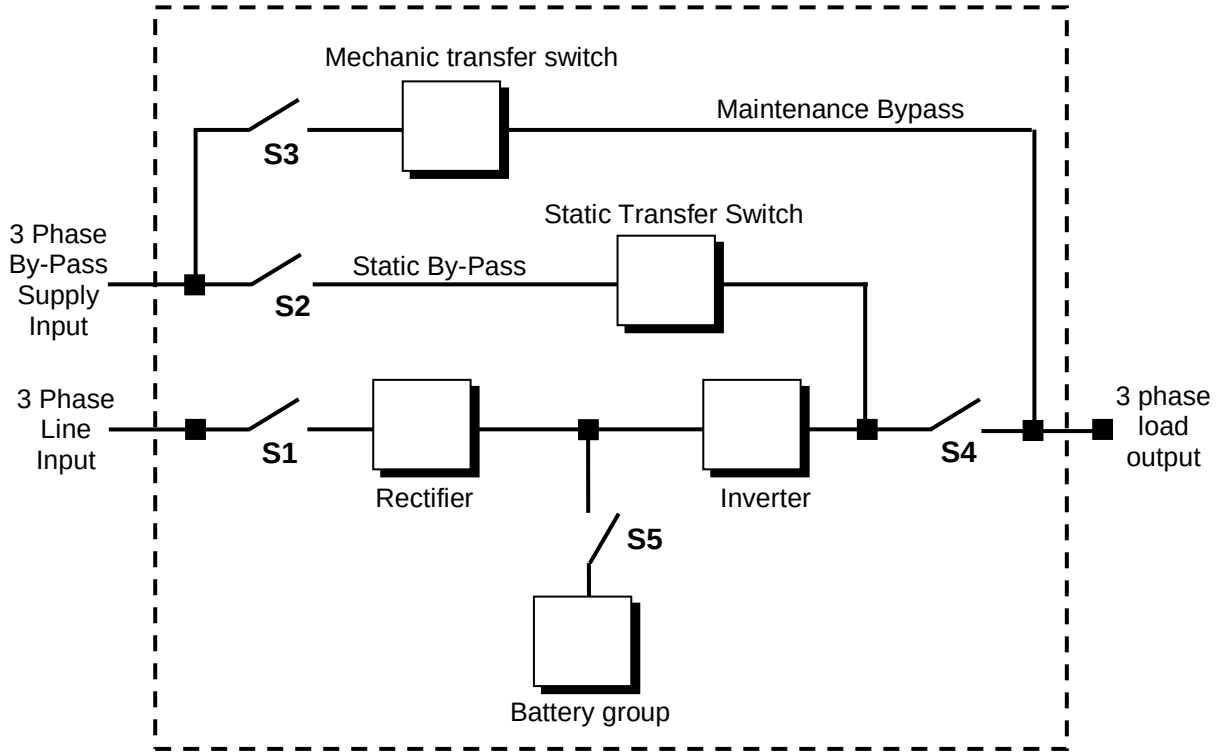


Figure 1.2 UPS Split (external) By-Pass Block Diagram

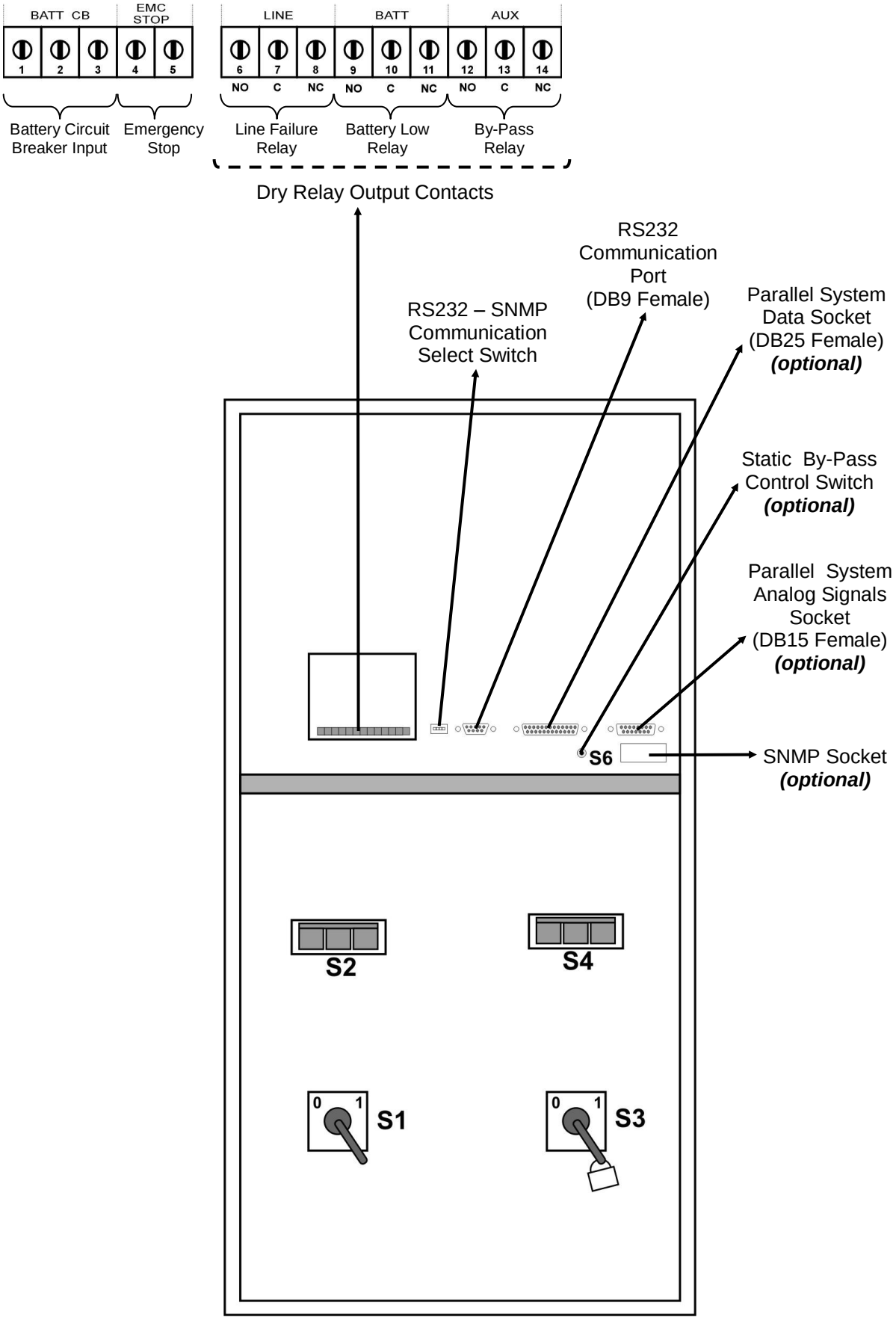


Figure 1.3.a 40-50-60 kVA Power Switch Locations

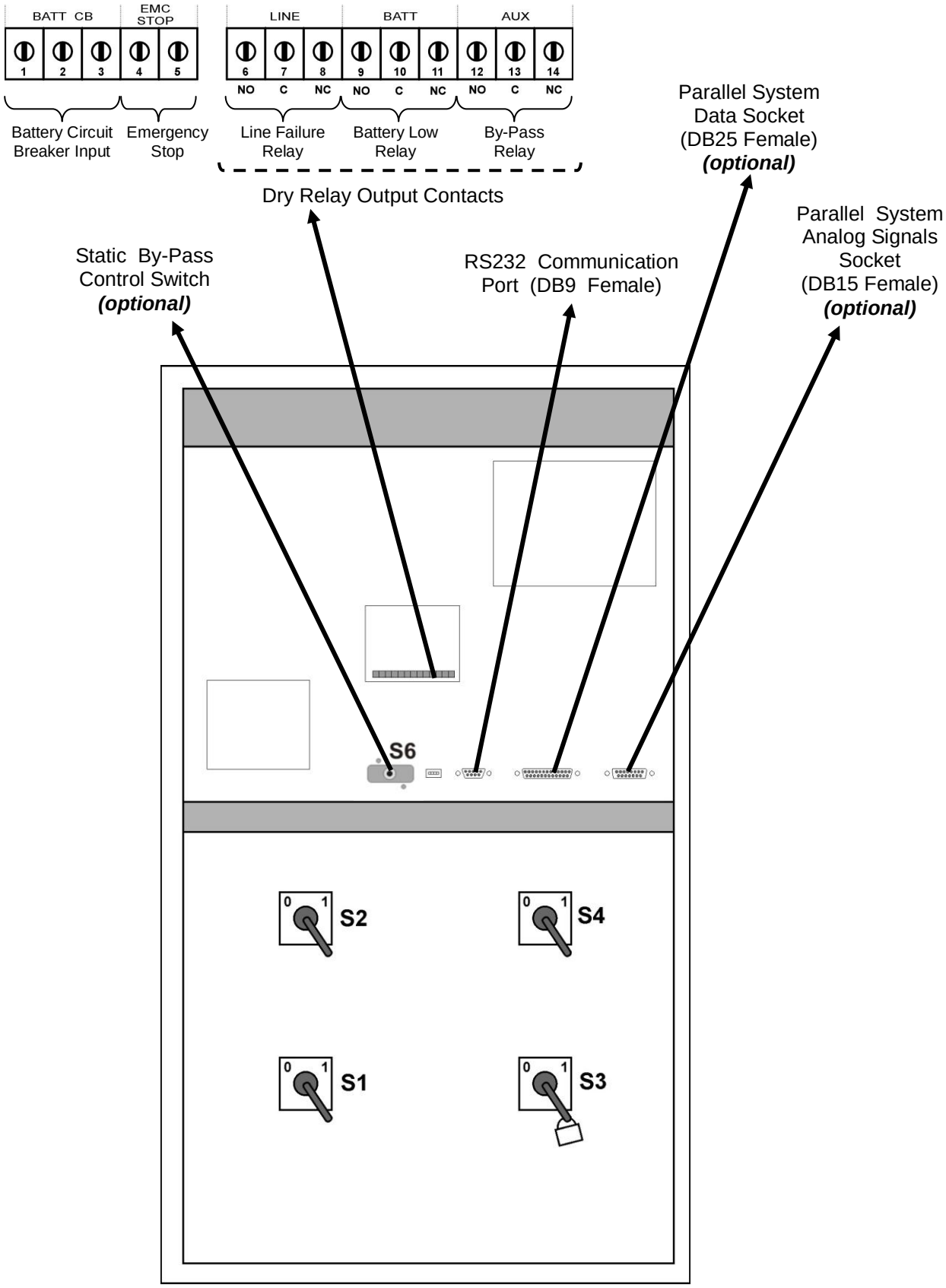


Figure 1.3.b 80 kVA Power Switch Locations

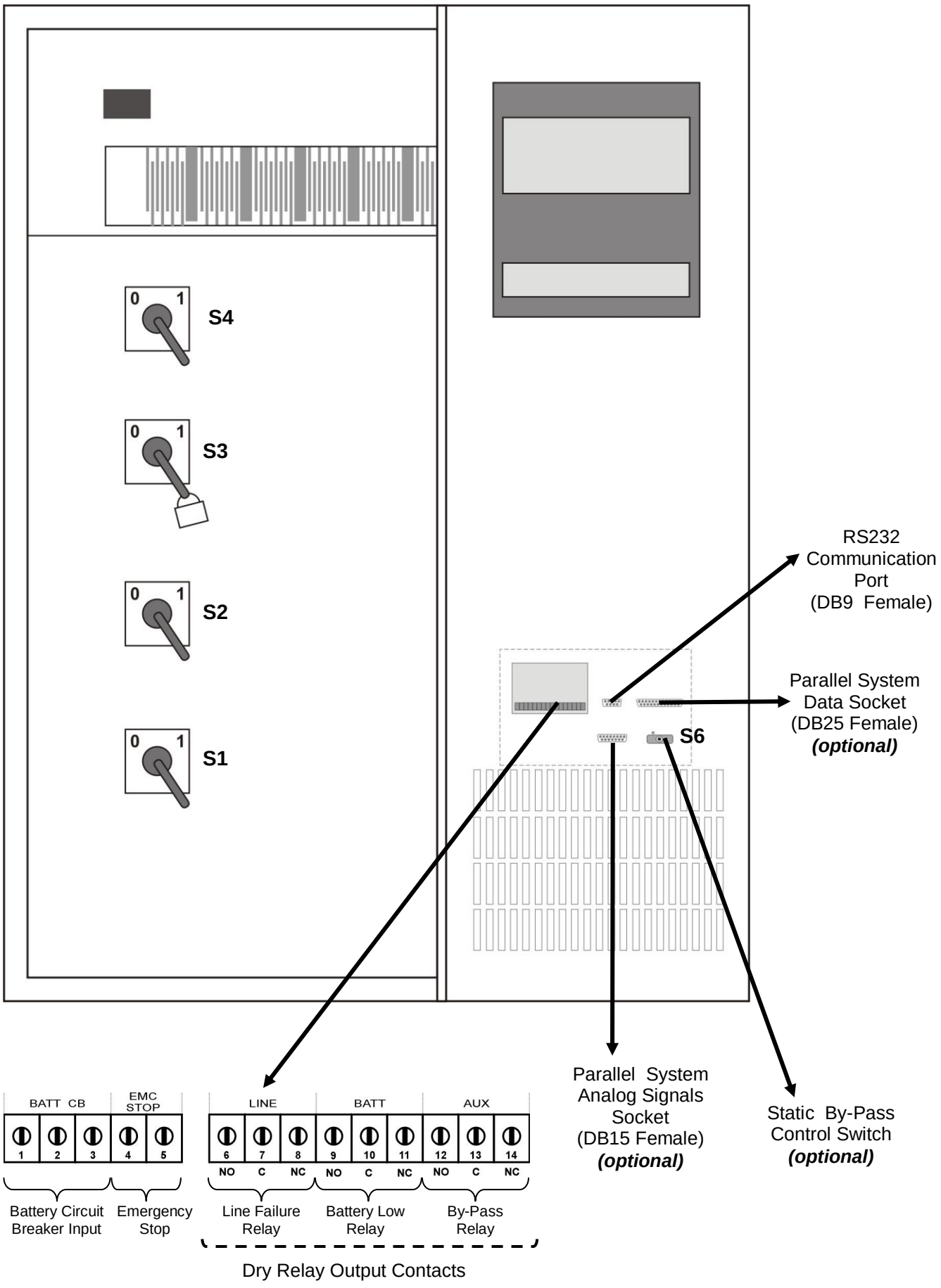


Figure 1.3.c 100-120-150-160-200 kVA Power Switch Locations

1.3 Technical Specifications

GENERAL SPECIFICATIONS	40	50	60	80	100	120	150	160	200
Output kVA	40	50	60	80	100	120	150	160	200
Output kW	32	40	48	64	80	96	120	128	160
Output Power factor	0,8								
Parallel Operation	Up to 2 UPS (1 Redundant) (optional)								
Hot Stand-by Operation	Up to 2 UPS (1 Redundant) (optional)								
Battery charging temperature compensation	Optional								
Emergency shutdown	Available								
INPUT									
Number of phase	3 phase								
Input voltage	220/380 Vac or 230/ 400 Vac 3 phase ,N								
Voltage tolerance	+15% , -15%								
By-pass voltage	220/380 Vac or 230/ 400 Vac 3 phase, N								
Input frequency	50 Hz. ± 5%								
RFI Level	EN 50091								
Split bypass connection	Available								
OUTPUT									
Number of phase	3 phase								
Nominal Output voltage	220/380 Vac or 230/ 400 Vac 3 phase ,N								
Voltage regulation tolerance	±1%								
Nominal Output frequency	50 Hz								
Output frequency tolerance (line syncron)	±2%								
Output frequency tolerance (free running)	±0,2%								
Efficiency 100% Load	90%								
Load Crest Factor	3:1								
Total Harmonic Distortion (THD)	<3%								
Overload	125% load 10 min.150% load 1 min.								
BATTERY									
Number of	30								
Run time	Optional								
Float charge voltage	405 Vdc								
End of charge voltage	300 Vdc								
Boost charge	Available								
Battery Test	1 time in 1 week (manuel test available)								
Charge time	<5 hours at full load								
Battery trip	Available								
INTERFACE									
Communication	RS232(standart) RS485 (optional) Up to 5 remote monitoring panel								
Remote control	Dry contact Line failure,battery low,bypass, EPO ,battery trip in/out								
SNMP capability	Optional SNMP adapter								
Modem connection	Available								
OTHER									
Maximum temperature	0-40°C								
Audible noise	<60 dBA				<64 dBA				
Humidity	%10-%90								
Dimensions (HxWxD) (mm)	1360x550x855			1450x720x800	1600x1100x800		1730x1195x870		

II. FRONT PANEL

2.1 Introduction

The front panel of UPS, consisting of a 2 lines alphanumeric display ,6 status lamps,plus 5 function keys, allows the complete monitoring of the UPS status. The mimic flow diagram helps to comprehend the operating status of the UPS. By using the function keys operator can moves on menus and change some parameters.

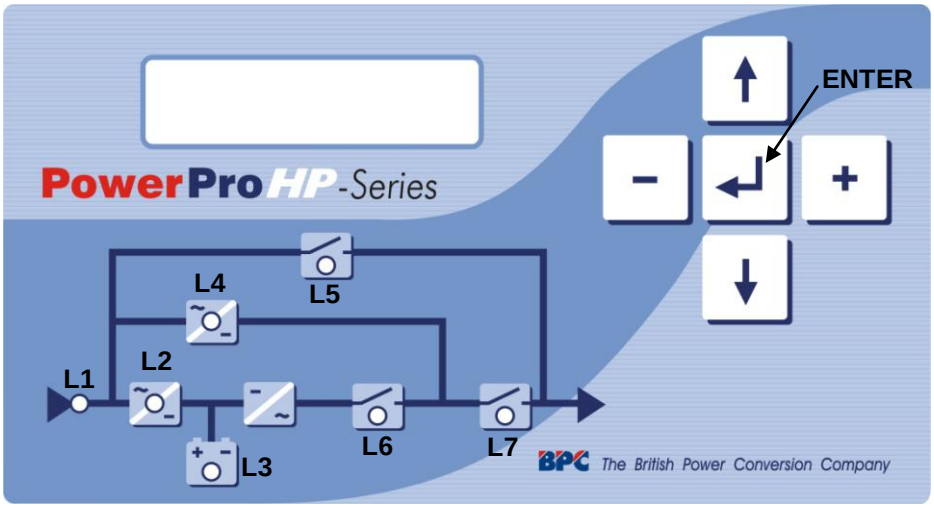


Figure 2-1 Operator control and indicator panel

L1 : If lamp is lit mains is okay
L2 : If lamp is lit the rectifier is operating
L3 : If lamp is lit UPS is operating on batteries
L4 : If lamp is lit static bypass is active and load is connected to mains voltage
L5 : If lamp is lit mechanical bypass switch is on
L6 : If lamp is lit inverter feeds the load
L7 : If lamp is lit S4 power output switch “1” on position. (Not exist in 40-50-60 kVA)

There are 5 function keys on front panel these are ENTER ,UP ,DOWN ,PLUS and MINUS.
UP and DOWN keys help moving on menus , PLUS and MINUS keys select options , ENTER key means the selected option or menu is valid.

NOTE : ALL MESSAGES SHOWN IN THIS CHAPTER IS VALID FOR MC VERSION OF UPS CONTROL SOFTWARE.

2.2 Alarms And Status Messages

Totally 64 alarm and status messages are used in UPS which helps the user. Messages are coded for easy dialog with service organization,all messages contains numbers A1-A2-A3….An. Messages and events in UPS are recorded to a log file with event time and date

ALARM	DESCRIPTION
A1 BYPASS FAILURE	Bypass system failure
Possible Causes:	1) Maybe bypass parts are defective call service
A2 INVERTER FAILURE	Inverter digital start system is failed
Possible Causes:	Internal failure. Call service.
A3 3 OVERTEMP	Overload in UPS repeated at 3 times in 30 min.
Possible Causes:	1) Overload 2) Fan failure or durty air inlets,outlets 3) Bad UPS settling

ALARM	DESCRIPTION
A4 OUT FAILURE	UPS output voltage is out of tolerance at 3 times in 30 min. Internal failure. Call service.
A5 BATT AUT END	Batteries empty at last of line out. Wait to return of electric.
A6 CHARGER FAULT	Rectifier is not to produce DC bus voltage.
A7 BATTERY LOW **Possible Causes:**	Batteries are low. 1) UPS wrought long time when line out 2) Charger system failure
A8 OUTPUT HIGH **Possible Causes:**	Inverter output voltage is over than max. tolerance voltage value. Inverter is stopped. 1) Inverter failure
A9 OVERLOAD	UPS loaded over than max. %100 load level.
Possible Causes:	Load on the UPS output is over than max. Load capacity. This state is maybe continous or short time. When this alarm is continous to check loads.
A10 LINE FAILURE **Possible Causes:**	Line failure. 1) Maybe line out 2) There is a problem on the UPS ınput board. Please Check. 3) UPS input fuses blowned.
A11 HIGH TEMPER **Possible Causes:**	Over temperature. (inverter or rectifier section) 1) Overload for inverter 2) Over temperature 3) Fan failure or durty air inlets 4) Bad UPS settling. There is not vantilation area.
A12 IGBT FAILURE **Possible Causes:**	Inverter output system failure. 1) Overload. 2) Short circuit. 3) UPS is out of order. Call service.
A13 OUTPUT LOW	Inverter output voltage is under than min. tolerance voltage value. Inverter is stopped.
A14 BATTERY HIGH	Battery voltage is over than max. tolerance.
A15 FUSE FAILURE	Fuse blowned. (not used at this power range)
A16 BYP INPUT BAD	During transfer to bypass ,Voltage or frequency value of bypass source is incorrect and the UPS turn off the load power. During normal (inverter) operation some times you can see this message. During bypass if the bypass protection option is on and if the bypass source is tolerant out UPS switch off the static bypass for load protection.
A17 BATT CB OPEN	Battery circuit breaker is off ,batteries are not connected to UPS At start up If the mains is okay you can start operation but this message is active At start up During Line failure UPS waits for turn on battery CB and then it starts
A18 BATT.CAPA.LOW	If the battery charge is low this message indicates that charge period is not completed. If mains failure occurs during this message battery operating time is not valid. UPS gives beep sound whitin 15 sec
A19 BATT FAULT **Possible Causes:**	Battery test aborted. And batteries are not OKAY UPS gives beep sound whitin 15 sec You can clear this message by pressing 3 seconds to ENTER key 1) Rectifier fault 2) Battery cells damaged 3) PURE battery connection
A20 BOOST CHARGE	Boost charge is active for 10 hours. At the end of this time UPS stops the boost charge. UPS gives beep sound whitin 15 sec
A21 ROTATE PHASE	Phase sequence is changed on the UPS input. Please change.
A23 MODE FAILURE	In parallel system, the operation mode of 1 UPS is differenf from the other
A24 P.FAILURE 17	Parallel controller board failure
A25 P.FAILURE 18	Parallel controller board failure
A26 P.FAILURE 19	Parallel controller board failure
A27 P.FAILURE 20	Parallel controller board failure

ALARM	DESCRIPTION
A28 P.FAILURE 21	Parallel controller board failure
A29 P.TEST MODE	Paralel controller is in test mode
A30 P FAILURE 23	Parallel controller board failure
A31 DUBL UPS NR. **Possible Causes:**	Same UPS number is used in parallel system. 1) Change from settings menu
A39 PSP FAILURE	Power supply is not functioning possibly because either of a wrong phase sequence or rectifier fault.
A40 CANT FIND PR	One of parallel modes is selected but there is no parallel control board on UPS Change mode from settings menu
A41 P.BAL.FAILURE	In parallel operation current sharing is not okay
A42 BATTERY TEST	Performing battery test
A43 P.SYNC.FAIL	In parallel system SLAVE UPS is not synchronized to MASTER UPS
A44 BT.OPERATION **Possible Causes:**	UPS is operating from batteries 1) Central system is black-out 2) Distribution problems upfront of the UPS
A45 MAINS OK	After mains failure, mains voltage restored again. This message appears on screen for 15 seconds after mains restored.
A46 BOOST CH.END	Boost charge mode is finished, normal charge is valid.
A47 CANNOT START	Analog start system in UPS is failed.

Status messages:

This message group simply shows the UPS STATUS at the upper line of LCD PANEL.

RECTIFIER START ! : UPS started the rectifier
INVERTER START ! : UPS started the inverter
MAINT SWITCH ON ! : Maintenance bypass switch is on
MANUEL BYPASS ! : Load is transferred to mains manually
STATUS ALARM ! : Alarm status
STATUS NORMAL ! : UPS is operating
EMERGENCY STOP ! : External emergency signal is detected.
WAITING SYNC ! : Inverter started waiting for syncronization
STATUS FAULT ! : Fault status
CLOSE BATT.CB ! : UPS is waiting for battery CB close
STATUS WARNING ! : Warning message is valid on LCD panel

RECTIFIER START :
At start up the UPS controller board check for input voltage, frequency, battery voltage for starting, if these parameters normal UPS starts.

INVERTER START :
If the inverter stops controller board tries to start again, during inverter start this message appears on first line of LCD PANEL.

MAINT SWITCH ON:
Maintenance bypass switch is connected from input to the output of UPS directly, controller stops inverter for accidental short circuits between mains voltage and inverter output. If the user turn off maintenance switch inverter starts again.

EMERGENCY STOP :
If an external EPO switch is installed to system (connected to interface board) ,to stop all UPS parts (rectifier ,static bypass ,inverter ,etc….) is possible . After pressing EPO switch all parts of the UPS stops ,for restart turn off S1 (inverter input) switch and turn on again.

FAULT STATUS :
In some cases controller checks events but can not find solutions, in this case controller decide to stop system ,for restart user must be turn off S1 (inverter input) switch and turn on again.

WARNING STATUS :
Some events recorded to log event file stays on LCD PANEL but UPS continues to work, these messages named as warning messages, user can clear this messages by pressing ENTER key for 3 seconds.
These are:

- A20 Boost charge alert
- A6 Charger fault
- A18 Batt capacity low

Shutdown Messages :

HP-300 series UPS's can operate interactive with operating system, by using some softwares you can send commands to UPS from operating system .UPS takes this commands and produces some messages these are:

WAITING SHUTDOWN : Shutdown command is performed from operating system and UPS is waiting for a certain delay for shutdown.
UPS SHUTDOWN : UPS is in shutdown status
WAITING RESTART : UPS is shutdown but it is waiting for a certain delay for restart
PAR.SHUTDOWN : In parallel system the other UPS send shutdown command and UPS is in shutdown status.
CANCEL SHUTDOWN : Shutdown command is canceled.

Only operating system or a PC computer can send this commands.
If the shutdown command is performed during line failure UPS shutdowns and is the mains is okay UPS starts again automaticly.

2.3 Menu Description

By using UP and DOWN function keys on front panel you can move on main menu functions ,when main menu appears on LCD panel if you press ENTER key you can go to submenu item.
In submenu you can move by UP and DOWN keys ,if there is option on submenu item ,you can change options by pressing PLUS and MINUS keys. If you press ENTER ket the option is valid.

MEASURES submenu
LD% (output load percentage)
OPV (output voltages)
FREQU (output frequency)
IPV (input voltages)
BYP (bypass source voltages)
BATT (battery voltage and current)
..... etc

SAMPLE menu selection:
If you want to go measures menu use UPS and DOWN keys find MEASURES MENU, press ENTER key ,now you can move on measures menu subitems by UP and DOWN keys.
At the end of sub menus ENTER EXIT is located, during this message if you press ENTER key you can go back main menu.

At ALARMS MENU you can see LOG HISTORY, log events are recorded with event time and date.

PASSWORD Menu is located for service purposes. This menu is developed for only adjustment.

Menu and submenu items

MAIN MENU	SUBMENU	MEANING
MEASURES MENU	LD%: 050 030 060	Output load
	OPV: 220 221 219 V	Output voltage
	FREQU: 50.0 Hz	Output frequency
	IPV: 240 230 226 V	Input voltages
	BYP: 225 221 219 V	Bypass source voltages
	IPI: 031 040 020 A	Ginput currents
	BATT: 432 V 06.7A	Battery voltage and charge current
	TEMP: 24 C	Cabinet inside heat
	CHARGE LEVEL: 60%	Battery charge level
	ENTER EXIT	Exit from submenu
ALARMS MENU	UPS STATUS	Valid alarm
	000>DATE AND ALARM	Recorded log events
	ENTER CLEAR LOG	Clearing log records
	PARR.ERR.NR	Parallel control board error nr.
	ENTER EXIT	Exit from submenu
INFORMATION MENU	SYNC :OK COMM :OK	Syncronization and comminication
	POWER: 20000 VA	Output power of the UPS
	VERSION : MC1XX	Version of UPS
	FREQUENCY : PLL/XTAL	Frequency generation mode
	ENTER EXIT	Exit from submenu
PASSWORD MENU	(password required)	System settings
	ENTER EXIT	Exit from submenu
SETTINGS MENU	MODE:	Operation mode selection
	UPS No :	UPS number selection
	REMOTE :ENABLE	Remote access on/off
	RESTART:ON/OFF	Mains restored setting
	BYP.PROTECT ON	Bypass load protection
	ENTER EXIT	Exit from submenu
COMMAND MENU	SOUND : ON/OFF	Sound alert on/off
	ENTER B.TEST>432	Manuel battery test
	ENTER <BYPASS>	Manuel bypass
	ENTER:MODEM INIT	Modem settings
	ENTER <BOOST>	Boost charge on/off
	SIMULATION OFF	Simülation mode selection
	ENTER EXIT	Exit from submenu
TIME MENU	TIME : 23 :15	time
	DATE : 11-10-2001	date
	SET HOURS: 11	Adjust hours
	SET MINS : 38	Adjust minutes
	SET DAY : 21	Adjust day
	SET MONTH : 06	Adjust month
	SET YEAR : 2001	Adjust year
	ENTER <UPDATE>	Write new time and date
	ENTER EXIT	Exit from submenu

2.4 MAIN Menu

The main menu items is given at the following table you can move on main menu items by using UP and DOWN keys.

Main Menu item	Function
STATUS MENU	The status message which shows the UPS status
MEASURES MENU	→ Enter "go to Meausures submenu"
ALARMS	→ Enter "go to Alarms submenu"
INFORMATION MENU	→ Enter "go to İnformation submenu"
PASSWORD MENU	→ Enter "go to password submenu"
SETTINGS MENU	→ Enter "go to Settings submenu"
COMMAND MENU	→ Enter "go to Command submenu"
TIME MENU	→ Enter "go to Time and date submenu"
Go to STATUS MENU	

2.5 MEASURES Menu Items

At this menu you can see all measured values, use UP and DOWN keys for moving on submenu items.

	Submenu item	Function
1	**LD%: 060 074 080**	Output load percentage (capacity %)
2	**OPV: 220 221 220**	Output voltages
3	**FREQU: 50.0 Hz**	Output frequency
4	**IPV: 240 235 220**	Input voltages
5	**BYP: 230 232 231**	Bypass source voltages
6	**IPI: 022 010 030**	Input currents (amperes)
7	**BATT: 430 V 22.1 A**	Battery voltage and charge current
8	**TEMP: 030 c**	Cabinet inside temperature
9	**CHARGE LEVEL :%100** **BATT.CAPACI:068%**	Battery charge level Remaining battery capacity when operationing on battery
10	**ENTER EXIT**	→ Enter **(↵)** exit from menu
	Goto first submenu item	

2.6 ALARMS Menu Items

At this menu you can see recorded log events and valid alarms

	Submenu item	Function
1	**UPS STATUS**	Valid alarm is on LCD PANEL
2	**000>311201 23:15**	See recorded log events : At the first line the first 3 numbers shows the event number. 000 numbered event is the last event. Date ddmmyy time:hh:mm At the second line of LCD PANEL you can see al recorded alarms. Use PLUS and MINUS keys for moving on events.
3	**ENTER CLEAR LOG**	→ Enter **(↵)** clear log event records After you cleared events you see EMPTY LOG message at lines
4	**PARR.ERR.NR : 017**	Parallel control board fault number. (use if the parallel board is installed) 0 means that there is no error on parallel board
5	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.7 INFORMATION Menu Items

This menu gives some information about UPS.

	Submenu item	Function
1	**SYNC :OK COMM :OK**	If the UPS is operating syncron to mains SYNC:OK ,if not syncron SYNC:-- If communication is active COMM:OK ,if not active COMM:--
2	**POWER: 20000 VA**	The maximum power rating of the UPS
3	**VERSION : MC1xx**	Shows the UPS version
4	**FREQUENCY : PLL**	Frequency generation mode PLL :phase locked loop is generating the frequency XTAL : XTAL oscillator is generating the frequency SLAVE : in parallel system master is generating the frequency
5	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.8 SETTINGS Menu Items

From this menu user can set some important options.

	Submenu item	Function
1	**MODE: ONLINE**	By using PLUS and MINUS keys you can move on 4 operation mode options **ONLINE** : stand alone mode **PARALLEL** : 2 UPS in symmetric parallel operation **HOT STANDBY** : 1 UPS main the other UPS spare mode **REDUNDANT** : 2 UPS in redundant parallel mode. → press ENTER for 3 seconds and the selection is valid
2	**UPS No : 001**	By using PLUS and MINUS keys you can change number 0 to 3. In parallel operation select different number for each UPS. If you select the same number DUBL UPS NUMBER message tells the fault. → press ENTER for 3 seconds and the selection is valid
3	**REMOTE :ENABLE**	By using PLUS and MINUS keys you can change enable and disable options. **enable** : remote battery test, shutdown and bypass function is enabled **disable** : these functions are disabled → press ENTER for 3 seconds and the selection is valid
4	**RESTART:ON/OFF**	By using PLUS and MINUS keys you can change on and off options. **ON** : during mains failure at the and of battery discharge UPS shutdowns ,after mains restored UPS startes again. (battery trip out is on every time) **OFF**: during mains restore UPS don't start again. (battery trip out is off) → press ENTER for 3 seconds and the selection is valid
5	**BYP.PROTECT ON**	By using PLUS and MINUS keys you can change on and off options. **ON**: if the bypass source is out of tolerant UPS turn off load power. **OFF** : UPS turn off load power only during bypass moves. If bypass period is completed UPS continues to feed load.
6	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.9 COMMAND Menu Items

You can give immediate commands to ups by using this menu.

	Submenu items	Function
1	**SOUND : ON/OFF**	Use for turn on/off beep alert sound. If you press ENTER key the option will change ,one press ON ,one press OFF. If the OFF option is used sound alert is turn off but if a new different alarm is valid UPS changes de option to ON state.
2	**ENTER B.TEST>432**	If you press enter for 3 seconds battery test starts for 15 seconds. If battery test failes **A6 BATT FAULT** message is on panel and this message stays until you press ENTER key for 3 seconds. Numbers at the right shows the battery voltage. Starting of battery test time is recorded to log event menu if the test is successful you can see only **BATTERY TEST** message on log records..
3	**ENTER <BYPASS>**	If you press ENTER key for 3 seconds UPS transfers load to bypass. If the load is on bypass in this submenu you see **ENTER<INVERTER>** message at this position if you press ENTER key for 3 seconds UPS transfers the load on inverter. In parallel modes this function disables and you see **BYP.FUNC.DISABLE** message on this submenu item.
4	**ENTER:MODEM INIT**	If you press ENTER key the connected modem of RS232 port is installed UPS sends AT command set to modem for installation. If the function is completed you must hear a beep sound. At the and of this function modem is ready to answer dial up connection.
5	**ENTER <BOOST>**	If you press ENTER key for 3 seconds boost charge starts. The given time for boost charge is 10 hours. At the end of this time UPS stops the boost charge. If the boost charge is active this submenu item changes to **STOP BOOST> 005H** message the 005H shows that boost charge is started before 5 hours. If the number is 10 boost charge stops. If you press ENTER key bosst charge stops immediately. Boost charge starting and boost charge end time is recorded to log event menu. If boost is active UPS beeps in each 15 seconds
6	**SIMULATION OFF**	The purpose of this submenu to check dry contact connections. Normally to check line failure contact you must turn off mains power. This is not necessary with this utility. 3 options are avalible. **SIMULATION OFF** simulaion mode is off **SIM:LINE FAILURE** if you press ENTER key for 3 seconds line failure lamp on interface board lits **SIM:LIN.F+BT.LOW** if you press enter key for 3 seconds line failure and battery low lamp on interface board lits **SIM:BYPASS** if you press ENTER key for 3 seconds bypass (aux) lamp on interface board lits. So you can check the connections
7	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.10 TIME Menu Items

You can see date and time of RTC (real time clock) on UPS. And you can adjust date and time.

	Submenu item	Function
1	**TIME : 23 :15**	time
2	**DATE : 11-10-2001**	date
3	**SET HOURS: 11**	(+) and (-) adjust hours (0-23)
4	**SET MINS : 38**	(+) and (-) adjust minutes (0-59)
5	**SET DAY : 21**	(+) and (-) adjust day (1-31)
6	**SET MONTH : 06**	(+) and (-) adjust month(1-12)
7	**SET YEAR : 2001**	(+) and (-) adjust year (2000-2099)
8	**ENTER <UPDATE>**	→ Enter update new date and time
9	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

2.11 PASSWORD Menu Items

Only service personnel can use this menu ,the incorrect use of this menu can cause to damage the UPS.

	Submenu item	Function
1	**PASSWORD : XXX**	Service password input (-) key 100 , UP key 10, (+) key 1 changes after you write the password on screen press ENTER key ,if the password is wrong the is no action. If the password is okay a beep sounds and you see ADJUST MODE at the second line.
2	**ENTER EXIT**	→ Enter **(↵)** exit from submenu
	Goto first submenu item	

III. PARALLEL OPERATION

3.1 Introduction

Two of HP-300 UPS can be used in parallel mode ,the purpose of parallel use:

- Increasing security
- Redundancy
- Power increment purpose

3.1.1 Security

At stand alone UPS systems mains voltage is spare energy in case of UPS failure, but some critical loads don't works with mains tolerances. Cause of this a second spare UPS is a better solution.

3.1.2 Redundancy

UPS designs are perfect but they takes all mains risks ,sometimes some failures is possible ,the lifetime of batteries and some parts are limited. In such a case the second UPS installed on system will be working on.

3.1.3 Power Increase

Some load systems always develop and the power need increases, the cheapest solution is to install one more UPS to the system.

3.2 Parallel Operation Modes

NOTE: Parallel control board and some accessories are not installed in a standard HP-300 series UPS, but parallel operation option is available for these models.

Parallel operation is possible in one of the three modes:

- SYMMETRIC PARALLEL operation
- REDUNDANT parallel operation
- HOT STANDBY operation

User can select one of the operation modes according to purpose. If parallel control board is installed in your UPS, you can select operation mode from SETTINGS MENU. In this chapter you can find parallel operation mode information.

CAUTION !!! **You must not set the operation modes of the parallel connected UPS's to "ONLINE", otherwise serious damage may occur in UPS's.**

3.4.1 Symmetric Parallel Mode

On UPS panel, shortly "PARALLEL MODE" word is used. This mode is useful for increasing power capacity. Mains power is used as the spare energy supply. In case of an Inverter failure in one of the UPS's, the static bypass system of all UPS's go to bypass together. If everything returns to normal, than the inverters resume the load together. If current sharing is active, current is shared 50%-50% by two UPS's. During bypass, the UPS's also share the load.
If this mode is active, on the LCD panel of one UPS, you will see "PARALLEL MODE/SL", and on the LCD panel of the other UPS, you will see "PARALLEL MODE/MS" : (SL means SLAVE, MS means MASTER)

The general diagram of parallel connection is shown below :

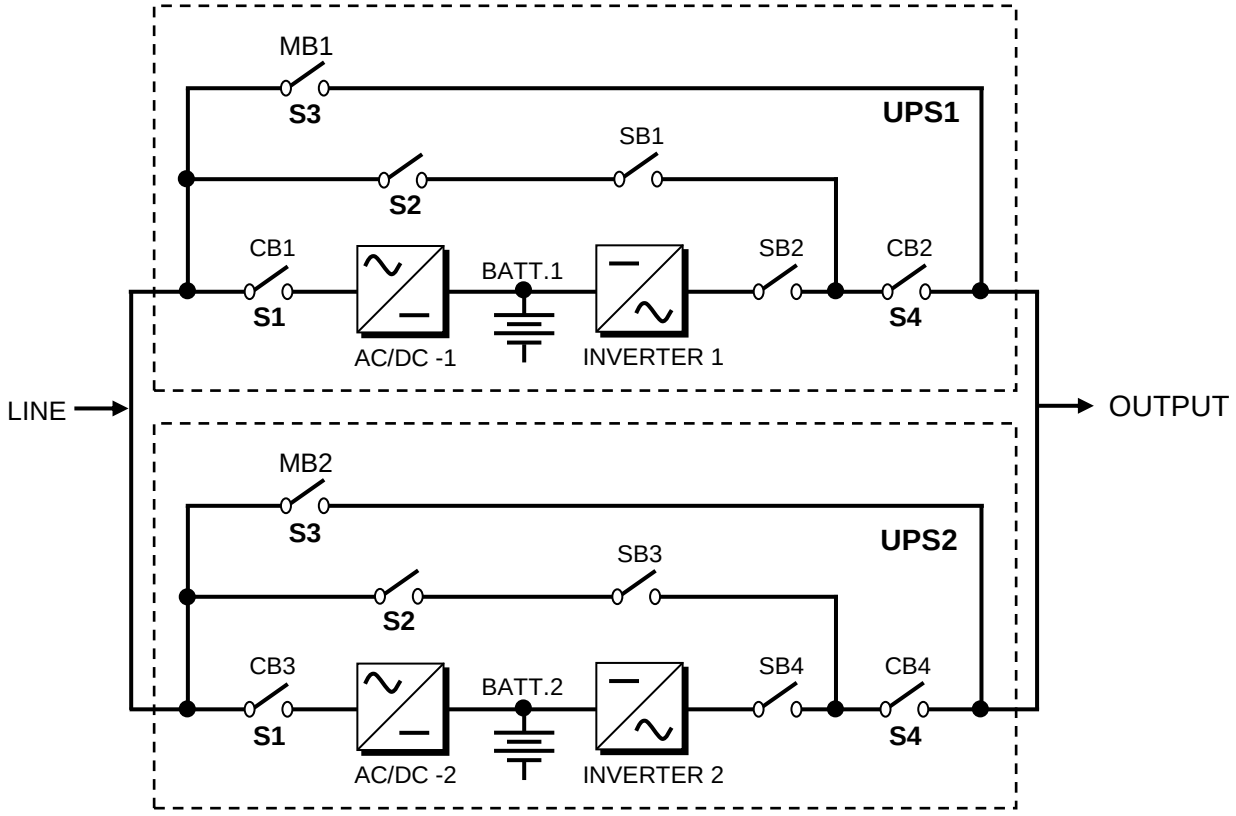


Figure 3-1 Parallel connected UPS's

The inputs of two UPS's are connected to mains, outputs of two UPS's are connected to each other. There are two battery groups.
SB1 and SB3 static bypass switches work always together. They turn on/off together. If these static switches are conducting the load is connected to mains directly.
SB2 and SB4 static switches work always together. If these static switches are conducting, the load is connected to inverter. In this position current sharing is active.
If a failure occurs in one UPS, bypass system transfers the load to bypass .
At this mode, power capacity is higher than only one UPS.

3.4.2 Redundant Parallel Mode

At this mode if one of the UPS's fails the other UPS continues to supply the load.
Assume that UPS1 on figure 3-1 is failed ,SB1 and SB2 static switches will turn off and the UPS 1 is isolated from load. The SB4 static switch of the UPS 2 will stay in conducted position and it continues to supply the load.
If UPS 1 is okay after a delay this UPS will join the system.

If two UPS's are in failure SB1 and SB3 static switches will turn on and load is transferred to bypass

This is a 3 level redundancy UPS1+UPS2 ,UPS2 ,mains
Current sharing is active in this mode.

In this mode the power of load must be lower than 1 UPS power.

In this mode, on the LCD panel of both UPS's you will see the message "REDUNDANT MODE".

3.2.3 Hot Standby Mode

If current sharing is active, two UPS's are operating continuously and lifetime of some parts will be shorten. Hot standby mode is a solution for increased UPS lifetime.

In this mode, UPS 1 supplies the load and the UPS 2 waits as spare. It is in standby mode but it is ready to work.

If a failure occurs in UPS 1, static switch system will isolate UPS 1 from the load and activates the UPS 2. This is a very fast response, the load doesn't understand the replacement.

Current sharing is not active in this mode.

In this mode, on the LCD panel of both UPS's you will see the message "HOT STANDBY".

3.3 Parallel Operation Mode Fault Codes

FAULT	DESCRIPTION
A23 MODE FAILURE	SLAVE ups search for the same operating mode with MASTER ups ,if they are different this message locates on LCD panel. Change the operation mode of SLAVE ups from SETTINGS MENU. Don't forget to press ENTER key for 3 seconds Turn off the SLAVE ups and turn on again.
A24 P.FAILURE 17	Parallel Controller Board Failure
A25 P.FAILURE 18	Parallel Controller Board Failure
A26 P.FAILURE 19	Parallel Controller Board Failure
A27 P.FAILURE 20	Parallel Controller Board Failure
A28 P.FAILURE 21	Parallel Controller Board Failure
A29 P.TEST MODE	Parallel control board is in test position
A30 P FAILURE 23	Parallel Controller Board Failure
A31 DUBL UPS NR.	The same UPS number is selected for SLAVE ups ,you must give separate ups number to each ups in parallel system. Goto SETTINGS MENU and change UPS number. Don't forget to press ENTER key for 3 seconds. Turn off the SLAVE ups and turn on again.
A40 CANT FIND PR	Parallel mode is selected but main controller could not find parallel control board. Select ONLINE mode from SETTING MENU. Turn off the ups and turn on again.
A41 P.BAL.FAILURE	Current sharing failed in parallel operation after a delay sharing will try again
A43 P.SYNC.FAIL	In parallel system SLAVE UPS is not synchronized to MASTER UPS After a delay SLAVE ups will try to syncron again.
A48 STATIC BYP	In parallel system static bypass switch (S6) is in "ON" position.

3.4 Parallel System Accessories

At standart HP-300 series there is no installed parallel components but they can install. For parallel operation the following parts are necessary:

- Parallel control board
- Current transformers
- Digital connection cable
- Analog connection cable
- Fully static bypass system

During order, the customer should give information about any options and accessories, to factory.

IMPORTANT NOTE: Parallel system installation is much more complex from stand alone UPS installation, it needs qualified service personnel.

You have to keep 80 cm distance between two UPS's for service purposes.

Add 20% tolerance to cable sizes, fuses and circuit breakers in parallel connection.

In figure 3-2 ,the connections of 2 parallel UPS's and load distribution panel are shown.

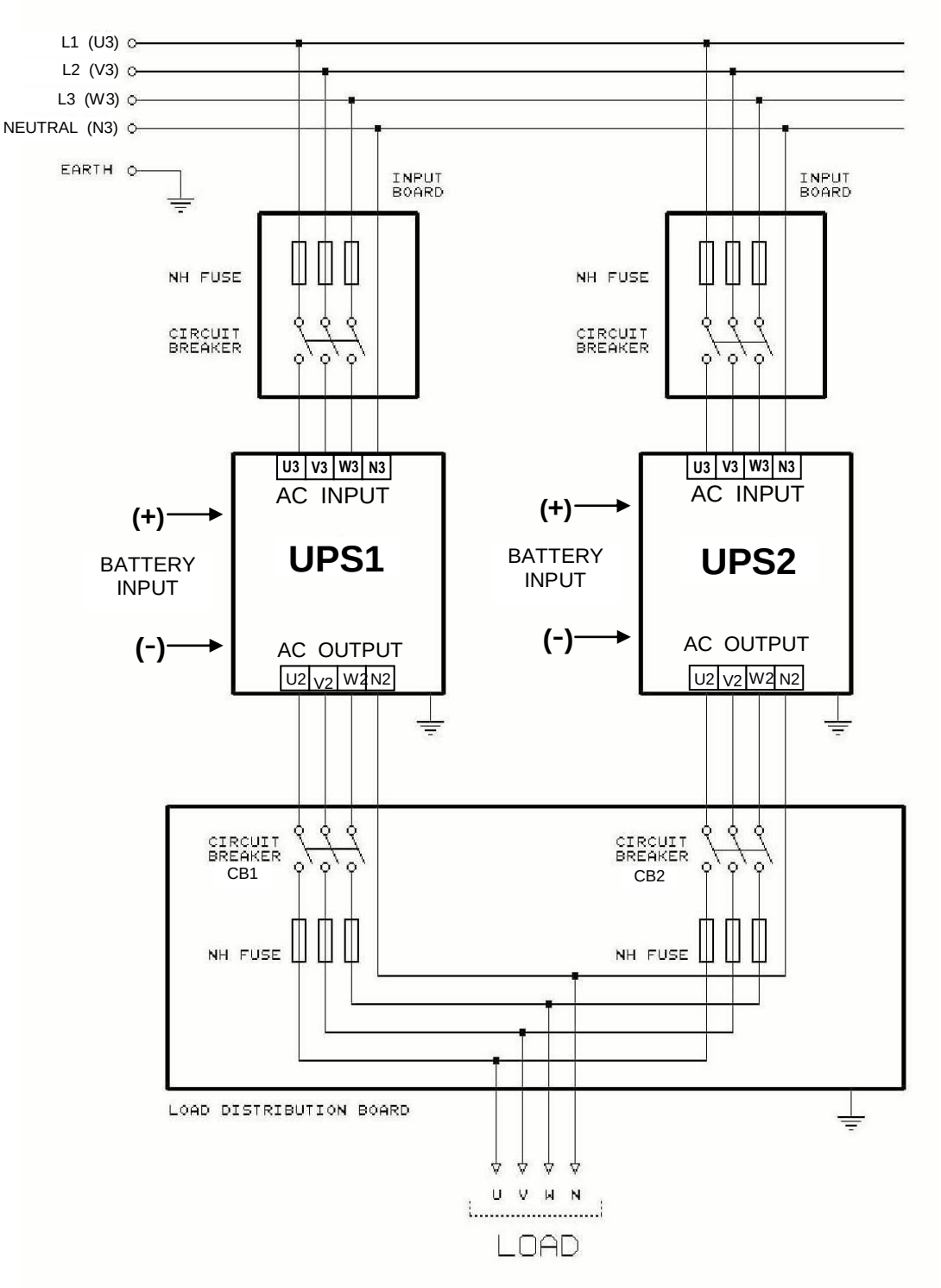


Figure 3-2 Parallel UPS Connection

IV. OPERATING INSTRUCTIONS

4.1 Introduction

The Operating instructions will be considered in two parts:
1. The operating instructions for a single UPS (ONLINE OPERATION)
2. The operating instructions for two UPS's which are connected in parallel.

4.1 OPERATING INSTRUCTIONS FOR A SINGLE UPS UNIT. (ONLINE OPERATION)

4.2.1 Procedure For Switching The UPS To Power The Load From a Power-Off Condition :

By applying this procedure UPS returns to normal operation, when it is completely off.

ATTENTION !!! The following action will apply power to the load equipment.

1) Make sure that all the switches and fuses (S1, S2, S3, S4 and S5) are in "OFF" position and S6 is in "NORMAL" position.

NOTE THAT S6 SHOULD ALWAYS BE IN "NORMAL" POSITION FOR ONLINE OPERATION

2) Turn S2 switch (static bypass) into "1" (ON) position.

3) Turn on S4 (output switch), now the load is connected to bypass supply.

4) Turn on the S1 switch (inverter input), into "1" position. By turning on S1, all lights on the front panel will be lit for 4 secs (lamp test) and then, the following messages will appear on LCD.

"RECTIFIER START" : Rectifier is operating and static bypass continues to supply the load.
"INVERTER START" : Inverter is operating and static bypass continues to supply the load.
"STATUS NORMAL" : The UPS is operating normally and the inverter is supplying the load.

ATTENTION : AC output voltage is applied to the load at this step.

5) Turn on the S5 (The battery circuit breaker) into "1" position or insert the battery fuse. By this way, the battery group is connected to the UPS.

6) Once you see the green inverter led on the front panel then the UPS system is now ready for use. You can start up your PC, printer and other critical loads.

ATTENTION : For using as a single unit, the UPS must be operated in "ONLINE" mode. And the mode selection can be mode as follows :

- Using the UP-DOWN buttons on the front panel, select "SETTINGS MENU" on LCD and press "ENTER". When you see "MODE" display, using "+" and "-" buttons select "ONLINE" mode.
- After selecting ONLINE mode press "ENTER" until the beep sound stops.
- Turn off S1 and after a few seconds, turn it on again. You will see "INVERTER START" and than "STATUS NORMAL" messages on the LCD.

4.2.2 Procedure For Switching The UPS Into a Maintenance Bypass From Normal Operation :

This procedure should be followed when turning from normal operation to maintenance bypass. This procedure can be used for supplying temporary mains voltage to the system during the maintenance of the UPS or in case of failure.

1. Press on the UP or DOWN button when there is “COMMAND MENU” message on the front panel of the UPS. Then press “ENTER” button.
2. Press on the UP or DOWN button when there is “ENTER <BYPASS>” message on the front panel of the UPS. Then press “ENTER” button for 3 seconds. L4 static by-pass led lit and L6 inverter led off. Now your load is supplied by the Static By-pass.

   NOTE : Using the procedure in 4.2.2.1 and 4.2.2.2 you can switch the load to by-pass manually. (MANUAL BY-PASS)
3. Take out the lock from the **S3** (maintenance bypass) switch.
4. Turn on (into “1” position) the **S3** (maintenance bypass) switch.
5. Turn off all the following switches into “0” position.
   S1 (inverter input)
   S2 (static bypass)
   S4 (UPS output)
   S5 (Battery circuit breaker or battery fuse)

WARNING!!! Inside the UPS the following points will be on operation:
* By-pass AC input mains terminals
* Maintenance by-pass switch
* UPS output terminals

Now your load is completely supplied by the maintenance by-pass supply and the UPS is not operating.

WARNING!!! During the maintenance or static by-pass the connected loads at the UPS output can not being protected against the mains (by-pass source) failure.

4.2.3 Procedure For Switching The UPS ON From a Maintenance By-Pass Power Down Condition :

1. While the S3 switch in closed position”1” (ON) ;
   turn on (into “1” position) the S2 (static bypass) and S4 UPS output) Switch.
2. Turn on (into “1” position) the S1 (inverter input) switch.
3. When “MAINT SWITCH ON!” message appears on the front panel, turn off (into “0” position) the S3 (maintenance by-pass) switch. By this way the load will be fed from the static by-pass.
4. See “STATUS NORMAL!” message on the front panel and the green inverter led lit.
5. Turn on the battery circuit breaker into “1” (ON) position (or insert the battery fuse).
   Now the UPS system is in normal operation. You can start-up your PC, printer etc.

4.2.4 Procedure For Switching The UPS From Manual By-Pass To Inverter (Normal Operation)

1. Press on the UP or DOWN button when there is “COMMAND MENU” message on the front panel of the UPS. Then press “ENTER” button.
2. Press on the UP or DOWN button when there is “ENTER <INVERTER>” message on the front panel of the UPS. Then press “ENTER” button for 3 seconds. L4 static bypass led off and L6 inverter led on. Now your load is supplied by the inverter.
3. See “STATUS NORMAL!” message on the front panel. Now the UPS system is on normal operation. You can start-up your PC, printer etc.

4.2.5 Procedure For Completely Powering Down The UPS :

TURNING OFF THE UPS

All the power switches, isolators and circuit breakers should be turned off, with the following sequence. (Turn off into "**0**" (OFF) position). There will be no voltage on the load.

WARNING!!! This procedure will cut the energy of all the equipments, which are connected to UPS output.

S4 (UPS output)
S2 (static by-pass)
S1 (inverter input)
S5 (Battery circuit breaker or battery fuse)

4.2.6 When Utility Power Is Interrupted

When there is a utility power interrupted, the L6 inverter led continuously lit also L3 battery and on the LCD **"A10 LINE FAILURE"** message appears. And also an audible alarm sounds. Your UPS continues to convert the battery voltage to AC voltage and protect against loss of data and failure. The autonomy can be increased by disconnecting relatively unimportant loads. But do not connect this load again while the autonomy. When the utility power is restored the UPS will return to normal operation and on the front panel of the UPS **"A45 MAINS OK"** mesage appears.

When there is a "**A7 BATTERY LOW**" message appears and audible alarm sounds shut down your PC. If not all the batteries will be discharge in a few minutes.
After you shut down the critical load (computer system). Apply the completely powering down the UPS.
Apply the normal operation procedure to start up the UPS again after a long time later.

NOTE: Do not forget to turn on the battery circuit breaker into **"1"** (ON) position when there is a mains voltage return. If not, in case of a second power cut there will be no voltage for the critical load. If you have a reserve generator, you can use it to feed the UPS's input and the batteries starts to charge. By using UPS and the generator at the same time ensures to charge the batteries faster.

4.3 OPERATING INSTRUCTIONS FOR PARALLEL CONNECTED UPS's

4.3.1 Procedure For Switching The UPS To Power The Load From a Power-Off Condition :

With all the switches and fuses (S1,S2, S3, S4 and S5) in "OFF" "0" position and with S6 in "NORMAL" position.

Turn on the parallel connected UPS's, UPS1 and UPS2 separately as follows:

1. Make sure that the two UPS's are properly connected for parallel operation in accordance with the diagrams given in "INSTALLATION PROCEDURES" section. (Section V.)
2. Turn on the S1 switch (inverter input) into "1" position. By turning on S1 you will see the following messages on the LCD panel,

   a. "RECTIFIER START"
   b. "INVERTER START"
   c. "STATUS NORMAL"

   After these messages the UPS will start running and the green INVERTER LED on the front panel will be turned on.

3. Using the UP-DOWN buttons on the front panel select “SETTINGS MENU” on LCD and press “ENTER”.
   When you see “MODE” display, using “+” and “-“ buttons select either one of the following operation modes which is suitable for your needs.

   OPERATION MODES:
   1. ON-LINE
   2. PARALLEL
   3. HOT-STANDBY
   4. REDUNDANT

4. After selecting one of the above modes, press “ENTER” until the beep sound stops.
5. Turn off S1 (inverter input) and after a few seconds, turn it on again. Now the inverter is ready to operate in the selected mode.

   Perform the same procedure given above for both UPS’s (UPS1 and UPS2). Make sure that you select the same mode for both UPS’s. If you select different modes, then a fault signal will be generated.
   After selecting the operation modes for both devices then perform the following procedure:
6. Turn on the Battery Circuit Breaker S5 (Optional) or insert the battery fuse, to connect the battery group to the UPS for uninterrupted operation.
7. Turn on S2 switches (static by-pass) of both UPS’s.
8. When you restart UPS’s again, make sure that the CB1 and CB2 switches on the AC distribution panel are in “OFF” position. Then turn on S4 (output) switches of both inverters.

   ATTENTION : VOLTAGE AT THE OUTPUT !!!
9. Before going any further, measure the voltage (using an AC voltmeter) between the corresponding phase outputs of UPS’s at the CB1 and CB2 contacts on the distribution panel. Only after you are sure that there is no voltage difference between the corresponding contacts, turn on CB1 and CB2 on the AC distribution panel.
   Now the outputs of the UPS’s are connected in parallel and the parallel system is ready for use with AC loads.

4.3.2 Procedure For Switching The UPS’s Into a Maintenance By-Pass From Normal Operation :

1) Bring S6 (static by-pass) of either one of the UPS’s into “STATIC BYPASS” position.

2) See that the red coloured by-pass leds on the front panels of both UPS’s are lit. (Static bypass operation)

3) Turn on S3 switches (maintenance bypass) of both UPS’s.

4) Turn off S4 switches (AC output) of both UPS’s.

5) Turn off S1 switches of both UPS’s.

6) Turn off S2 switches (AC output) of both UPS’s.

7) Turn off S5 (optional battery circuit breaker) or remove battery fuses of both UPS’s.
Now, the UPS’s are completely turned off but the load is supplied by the AC-input via the Maintenance By-Pass switch.

WARNING!!! Inside the UPS’s the following points will be on operation:
* By-pass AC input mains terminals
* Maintenance by-pass switch
* UPS’s output terminals
Now your load is completely supplied by the maintenance by-pass supply and the UPS’s is not operating.

WARNING!!! During the maintenance or static by-pass the connected loads at the UPS output can not being protected against the mains (by-pass source) failure.

4.3.3 Procedure For Switching The UPS-ON For Normal Operation From a Maintenance By-Pass Power Down Condition :

With the S6 switches (static bypass) of the inverters (at least one of them) in “STATIC BYPASS” position, turn on the parallel connected UPS’s UPS1 and UPS2 as follows:

1) Turn on the S2 switches (static bypass) of both UPS’s.

2) Turn on S4 switches (AC output) of both UPS’s.

3) Turn on S1 switches (inverter input) of both UPS’s.

4) Turn on the Battery Circuit Breakers S5 (optional) or insert the battery fuses of both UPS’s to connect the battery groups to the UPS’s for uninterrupted operation.

5) When “MAINT SWITCH ON!” message appears on LCD, turn off S3 switches (maintenance bypass) of both UPS’s.

6) Bring S6 switches (static bypass) of both UPS’s to “NORMAL” position.

V. INSTALLATION PROCEDURE

5.1 Introduction

WARNING!!!

- Do not apply electrical power to the UPS equipment before the arrival of authorized service personnel.
- The UPS equipment should be installed by a qualified service personnel.
- The connection of the batteries and the maintenance should be done by the qualified service personnel.
- Do not make short- circuit to the batteries poles. Because of the high short-circuit current, it has the danger of electrical shock or burn.
- Eye protection should be worn to prevent injury from accidental electrical arcs. Remove rings, watches and all metal objects. Only use tools with insulated handles. Wear rubber gloves.

This chapter contains location installation information of the UPS and the batteries. All the establishments have their own specialties and needs. So in this part the installation procedure is not being explain step by step. Instead general procedure and the applications are explained for the technical personnel.

5.2 Unpacking

The UPS is packed and enclosed in a structural cardboard carton to protect it from damage.

1. Inspect for damage that may have occurred during the shipment If any damage is noted, call the shipper immediately and retain the shipping carton and the UPS.
2. Carefully open the carton and take the UPS out.
3. Retain the carton and packing material for future use.

Unit package contents :

- User Manual
- Guarantee Certificate
- Battery cabinet and/or shelf
- Battery Circuit Breaker (Optional)
- Parallel mode digital interface cable
- Parallel mode analog interface cable

5.3 Equipment Positioning

1. The equipment's installation place must be an easy serving place.
2. Install the UPS in a protected area with adequate air flow and free of excessive dust.
3. You must therefore allow for a minimum gap of 250 mm behind the unit to allow adequate air flow (See Figure 5.1)
4. Select a suitable place (temperature is between 0°C and 40°C) and the relative humidity (%90 max)
5. It is recommended to air-conditioned the room (24°C)
6. Temperature is a major factor in determining the battery life and capacity. Battery manufacturers quote figures for an operating temperature of 20°C. On a normal installation the battery temperature is maintained between 15°C and 25°C. Keep batteries away from main heat sources or main air inlets etc.
7. In case of an operating the UPS in a dusty place, clean the air with a suitable air filtration system.
8. Keep out of your equipment from the explosive and flammable items.
9. Avoid direct sunlight, rain, and high humidity.

WARNING!!! Check the capacity of the forklift if it is available for lifting.
DO NOT MOVE THE BATTERY CABINET WHILE THE BATTERIES ARE INSTALLED.

5.4 Connecting The UPS Power Cables

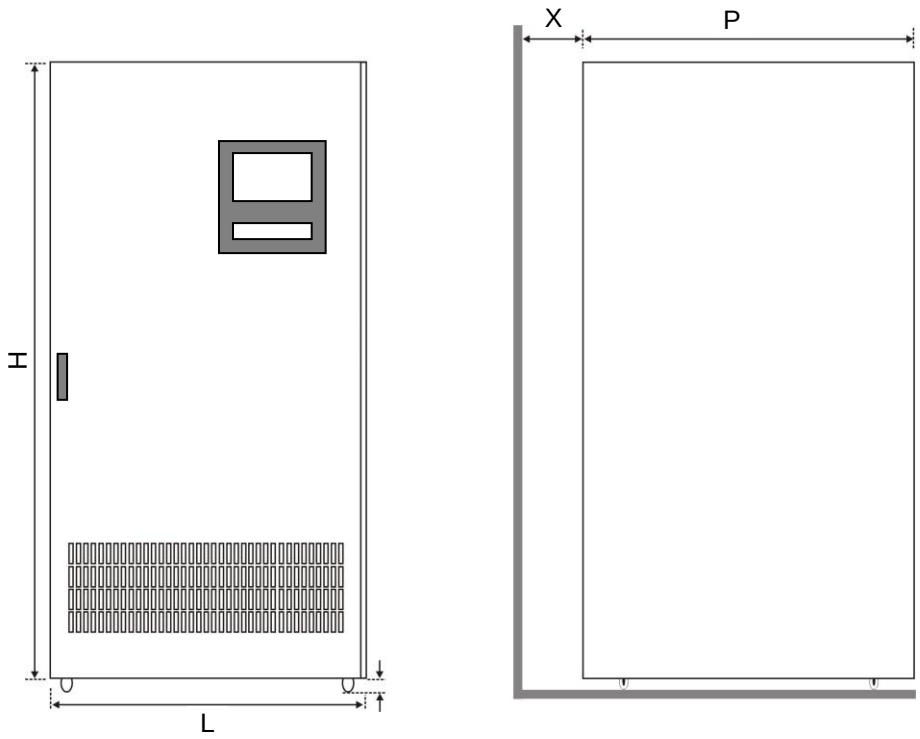
CAUTION! Only qualified personnel should install or service UPS / batteries.

The ac input to the UPS should be supplied by a separate line from the ac distribution board.

The input/output cables can be sized to suit the modules rating according to the table below.

The connections of the electric panel should be supplied by grounded outlet. Cables enter the UPS modules via entry panels in the base of cabinet. All control cables should be screened and run in a separate trunking to the power cables.

The input/output cables can be sized to suit the modules' rating according to the table below.



UPS (KVA)	3 Phase Input/Output								
	40	**50**	**60**	**80**	**100**	**120**	**150**	**160**	**200**
L	550			720	1100		1195		
P	855			800	800		870		
H	1360			1450	1600		1730		
X (min)	250								

NOTE : All the dimensions are in mm .

Figure 5-1 Installation Diagram

UPS RATING (kVA)	NOMINAL CURRENT : Amps / Recommended Cable Size (mm^2)							BUS BAR CONNECTION STUD SIZE	
	Input Mains With full battery Recharge			Bypass / output At full load			Battery at min. Battery Voltage	Input/Output Cable Terminations U-V-W-N	Battery Terminations + & -
	380V	400V	415V	380V	400V	415V			
	A / mm^2	A / mm^2	A / mm^2	A / mm^2	A / mm^2	A / mm^2	A / mm^2		
40	85A / 25	78A / 25	73A / 25	61A / 16	58A / 16	56A / 16	110A / 35	M6	M8
50-60	128A / 35	117A / 35	109A / 35	91A / 25	87A / 25	84A / 25	163A / 50	M6	M8
80	168A / 50	160A / 50	154A / 50	121A / 35	115A / 35	111A / 35	220A / 70	M6	M8
100-120	256A / 70	234A / 70	218A / 70	182A / 70	174A / 70	168A / 70	326A/100	M8	M8
150-160	329A / 95	312A / 95	301A / 95	230A / 70	218A / 70	210A / 70	430A/120	M8	M8
200	357A /185	339A /185	327A /185	243A /150	230A /150	223A /150	560 /185	M8	M10

NOTES: The neutral conductor should be sized for 1,5 times the output/bypass phase current. The Earth conductor should be sized at 2 times the output/bypass conductor (this is dependent on the fault rating, cable lengths, type of protection etc.) These recommendations are for guideline purposes only and are superceded by local regulations and codes of practice.

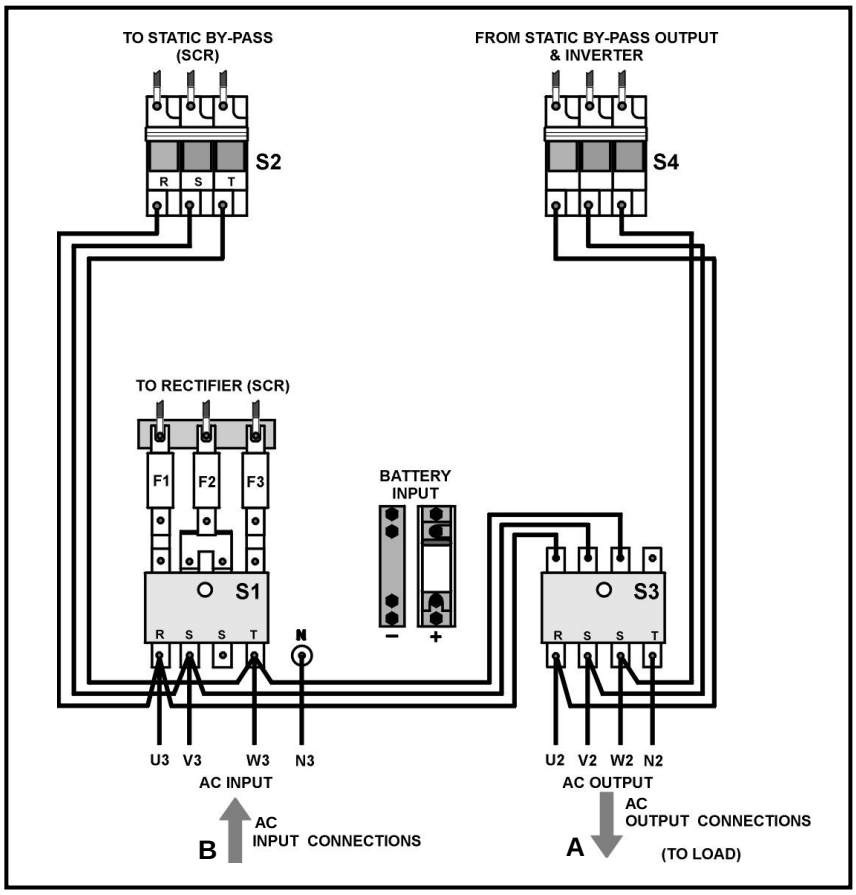
5.4.5 Safety Earth

The safety earth cable must be connected to the earth BUS BAR and bonded to each cabinets in the system and also the earthing and neutral bonding arrangements must be in accordance with the local laws.

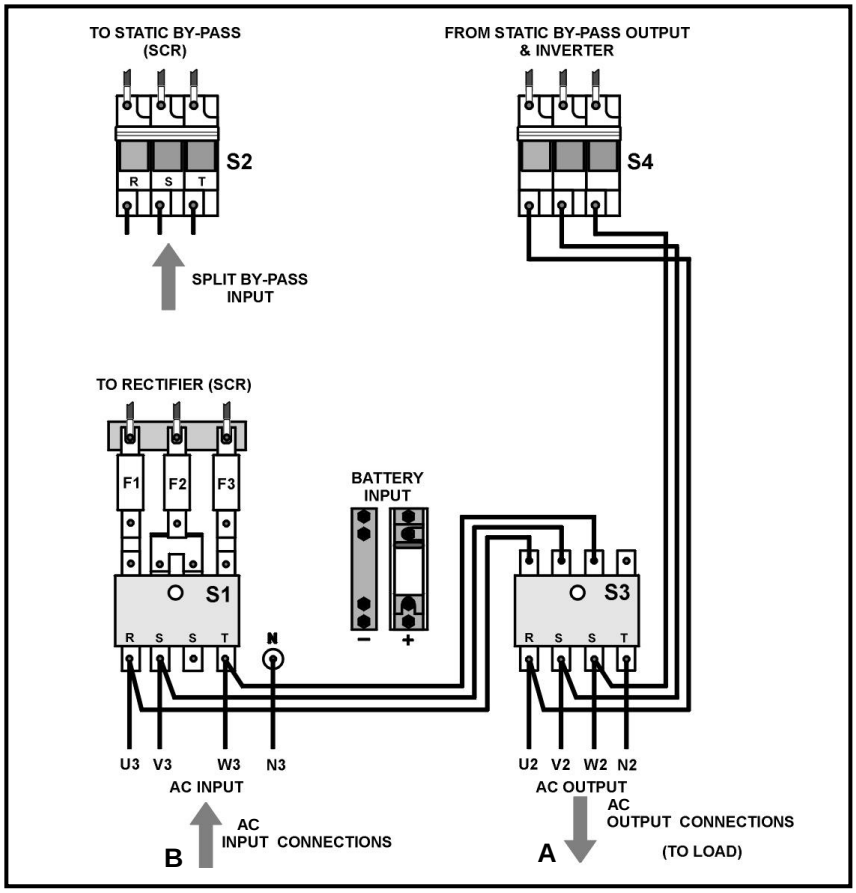
ATTENTION!!! Failure to follow adequate earthing procedures can result in electric shock hazard to personnel, or the risk of fire.

5.4.6 Cable Connections

ATTENTION!!! All the cable connections of the ups must be done by the authorized service personnel. Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure:

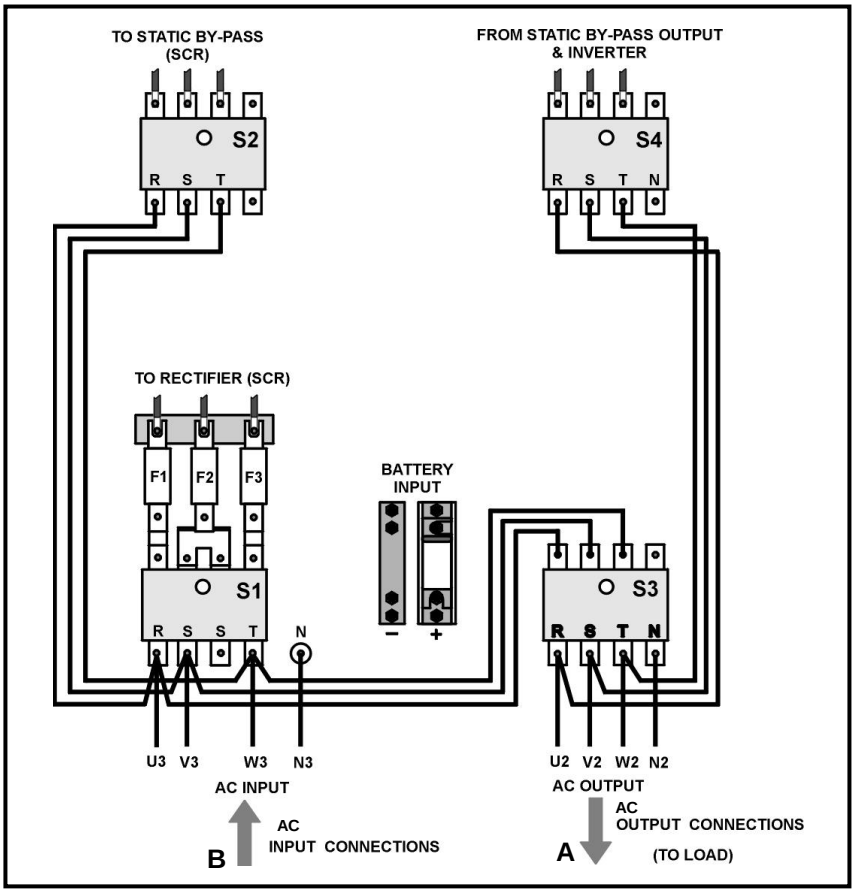


Normal Connections

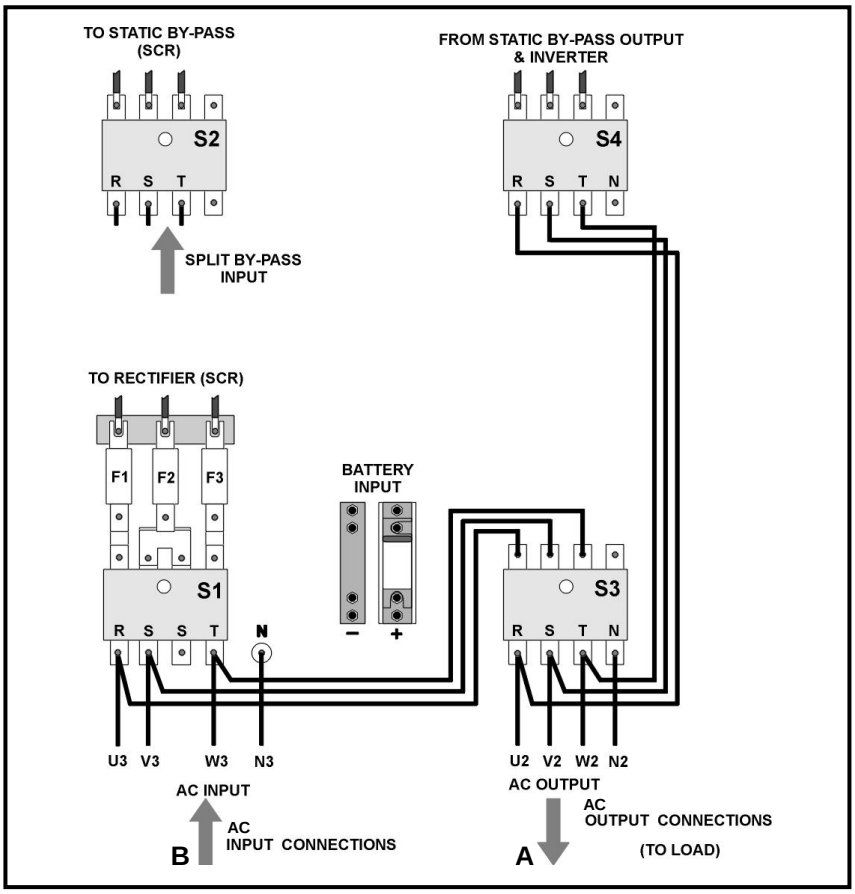


Split By-Pass Connections

Figure 5-2-a 40-50-60 kVA UPS Power Connections



Normal Connections



Split By-Pass Connections

Figure 5-2-b 80 kVA UPS Power Connections

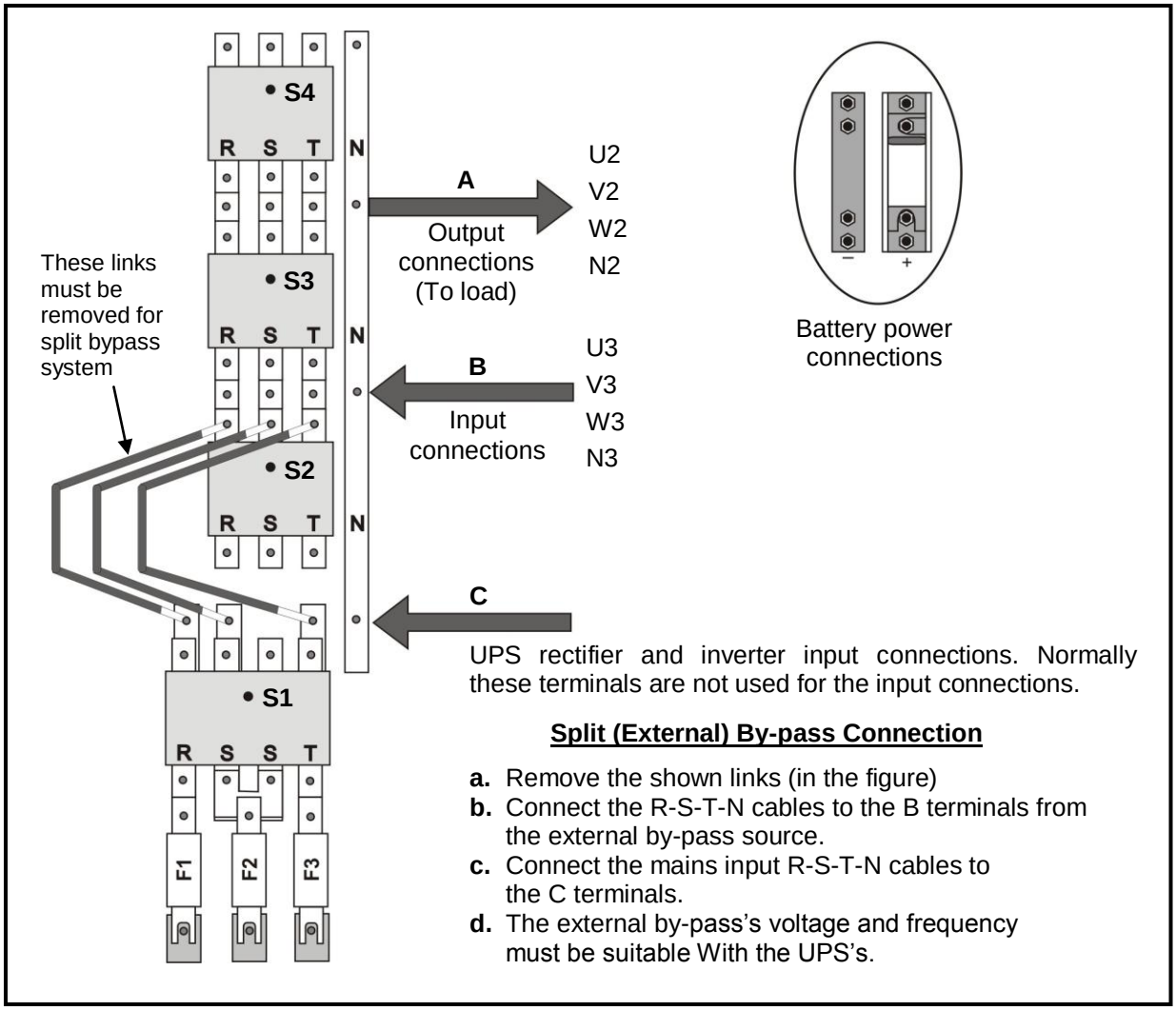


Figure 5-2-c 100-120-150-160-200 kVA UPS Power Connections

1) Verify that the UPS's switches are totally at "0" position.

2) Connect the AC input supply cables coming from the input mains distribution panel to the B terminals as in Fig. 5-2-a,b,c.

ATTENTION!!! ENSURE CORRECT PHASE SEQUENCE
If there is a phase sequence fault, A21/A39 "ROTATE PHASE" message appears on the front panel and the UPS can't work.

THE CORRESPONDING AC INPUTS OF BOTH UPS's (U3-V3-W3) MUST BE EXACTLY OF THE SAME PHASE.

3) Connect the UPS output cables from the output terminals to the load distribution panel.

ATTENTION !!! **For proper load sharing during parallel operation the cables between the AC distribution panel and the AC output terminals of one UPS must be exactly the same size and length as the cables between the distribution panel and the AC output terminals of the second UPS.**

4) Make the connection of the battery groups. Please look at the 5.4.3 Battery Installation item for it.

ATTENTION!!! Remove the battery fuses before making the connection of the battery circuit Breaker during the battery installation. (Turn off into "0" (OFF) position)

5) Connect the copper earth bus, which is under the safety earth and the cables power connection.

Note: The earth and the neutral connections must be in accordance to the local Rules.

6) If the REMOTE STOP option is going to be used, you should connect the remote stop button (normally open), to the pins 4 and 5 of the remote stop connector (CN3) on the PCB ITF3.

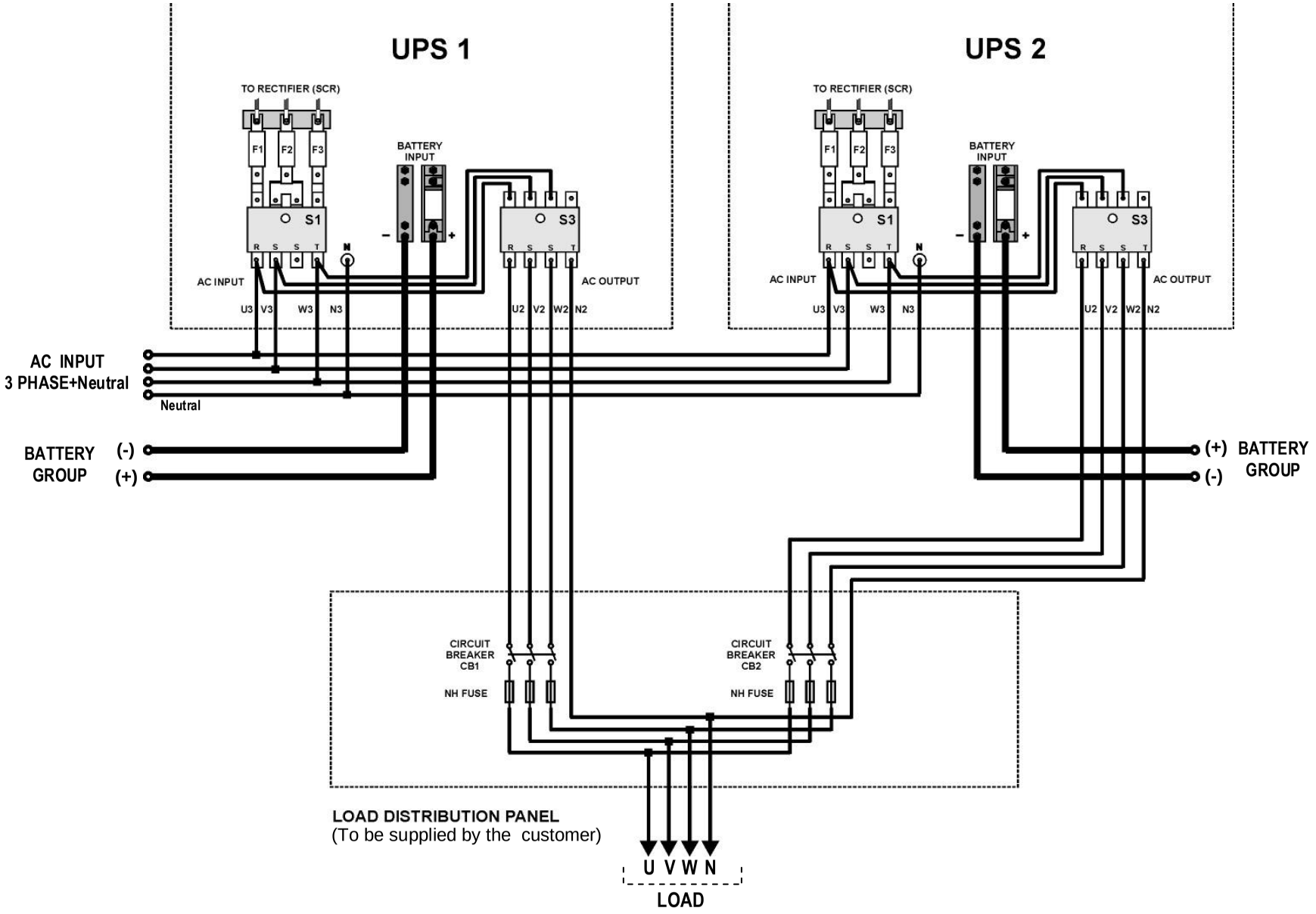


Figure 5-3-a POWER CONNECTIONS OF TWO UPS's FOR PARALLEL OPERATION (40-50-60-80 kVA)

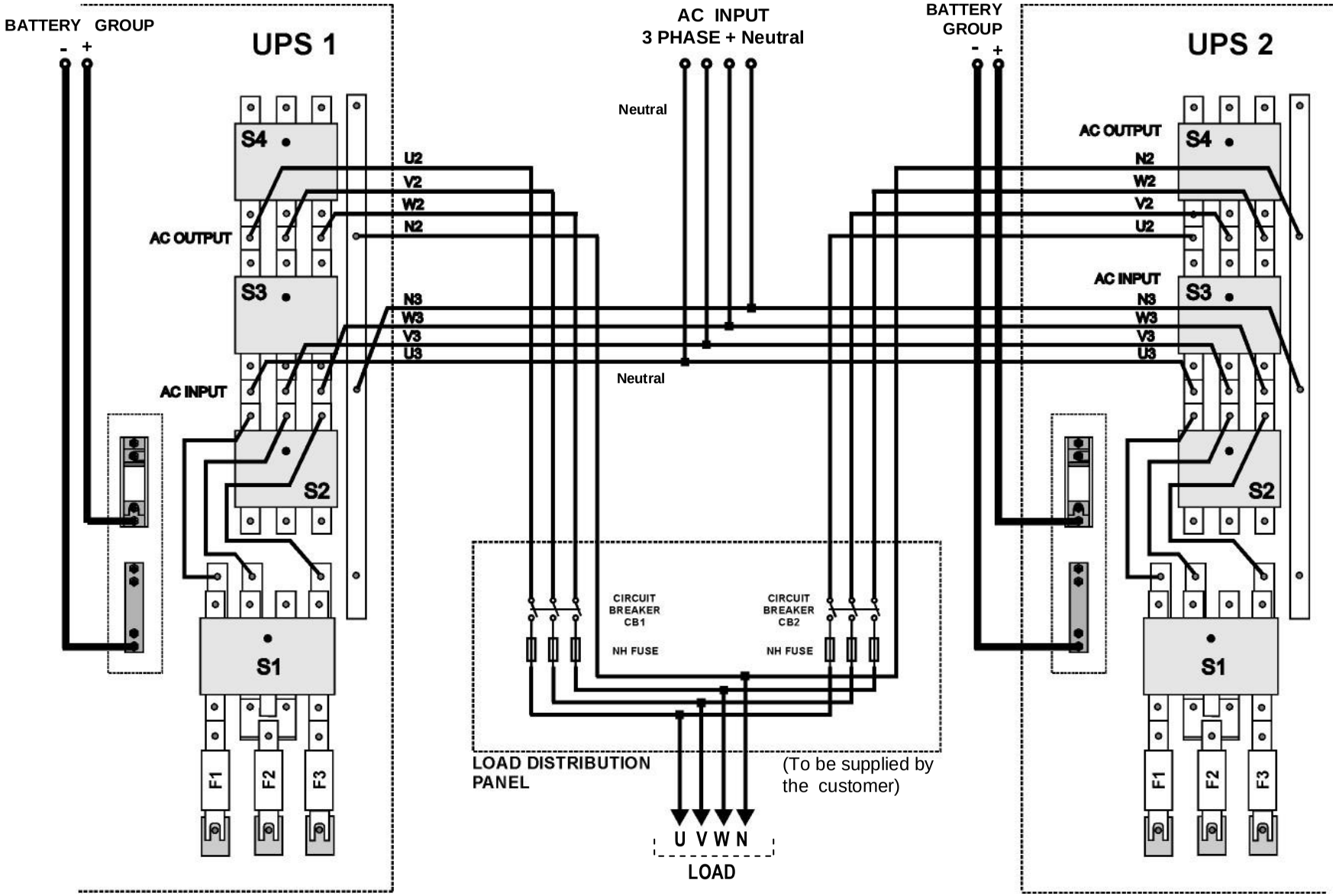


Figure 5-3-b POWER CONNECTIONS OF TWO UPS's FOR PARALLEL OPERATION (100-120-150-160-200 kVA)

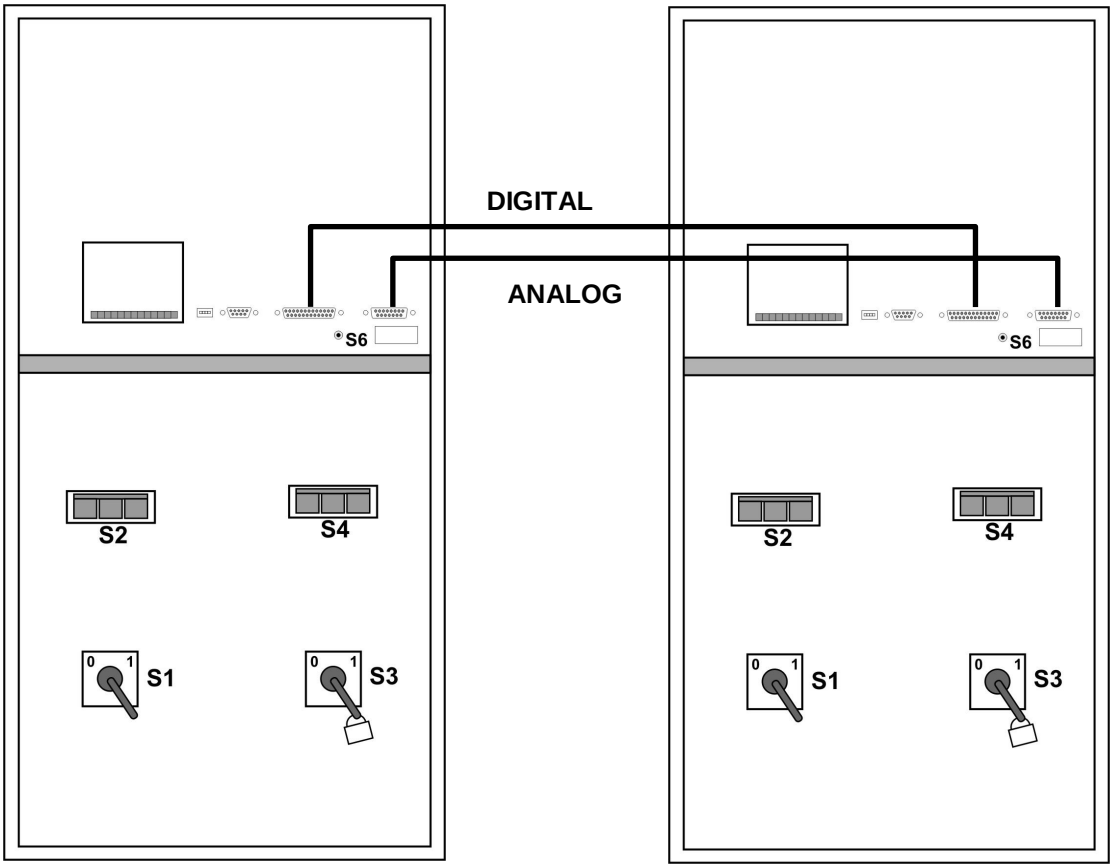


Figure 5-4-a Switch and Fuse Positions and Signal cable connections for parallel operation (40-50-60 kVA)

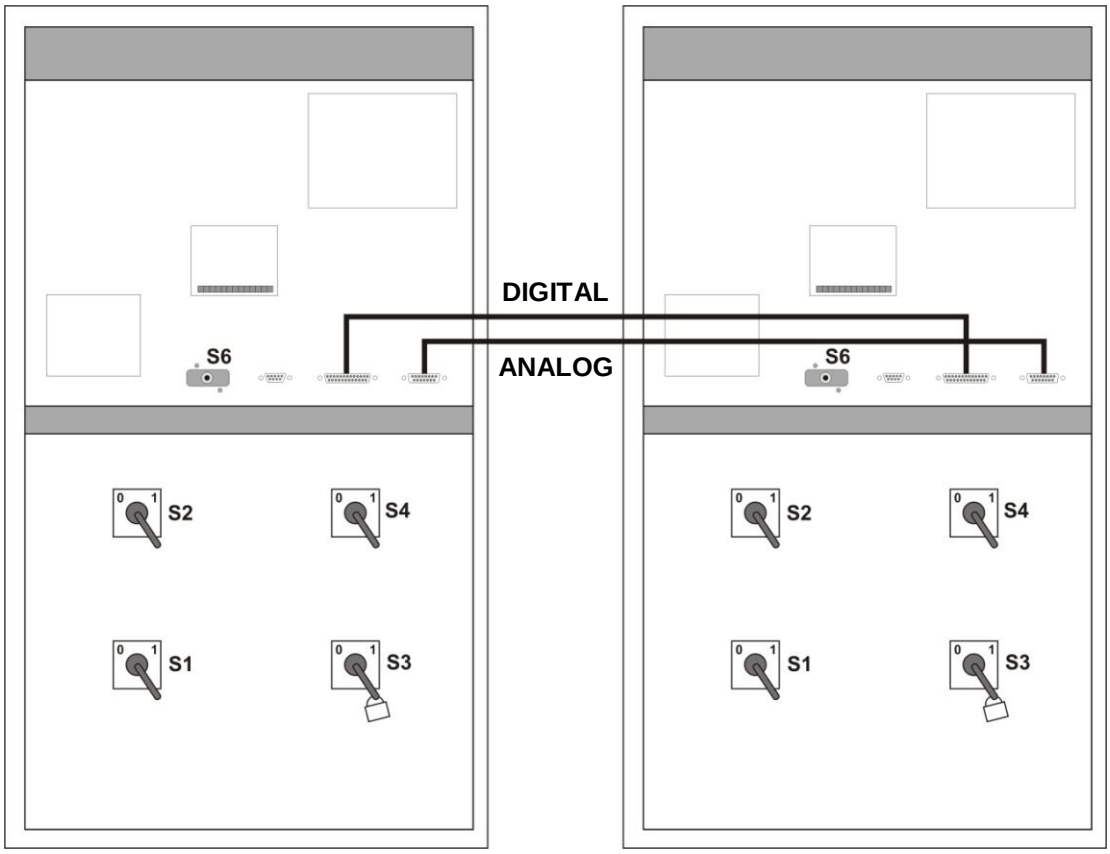


Figure 5-4-b Switch and Fuse Positions and Signal cable connections for parallel operation (80 kVA)

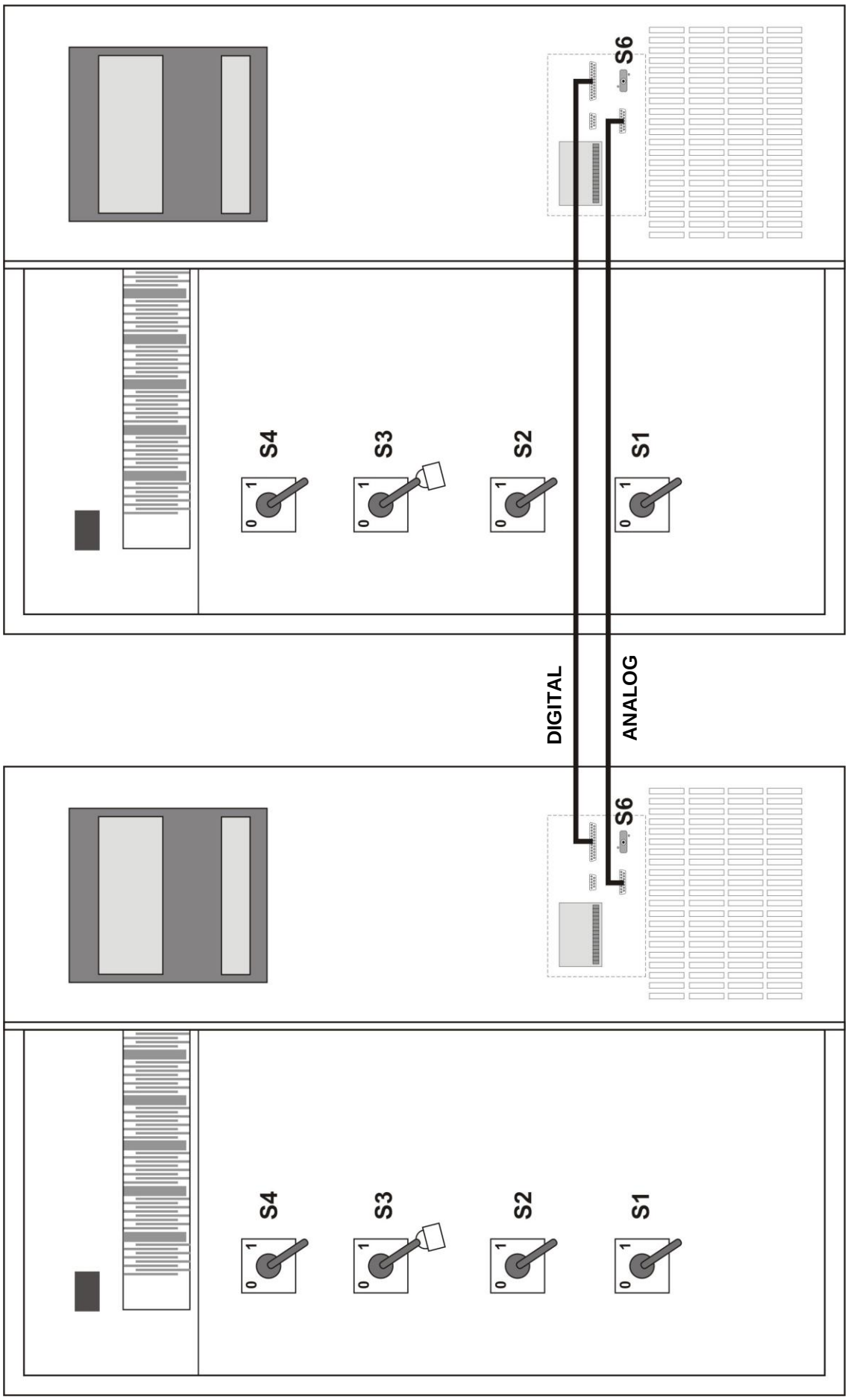


Figure 5-4-c Switch and Fuse Positions and Signal cable connections for parallel operation (100-120-150-160-200 kVA)

5.4.7 Battery Installation

ATTENTION!!! Remove the battery fuse before making the connection of the battery circuit breaker box during the battery installation.

The batteries associated with the UPS equipment are usually contained in a purpose-built battery cabinet, which sits alongside the main UPS equipment. Sealed, maintenance-free batteries are normally used in this type of installations.

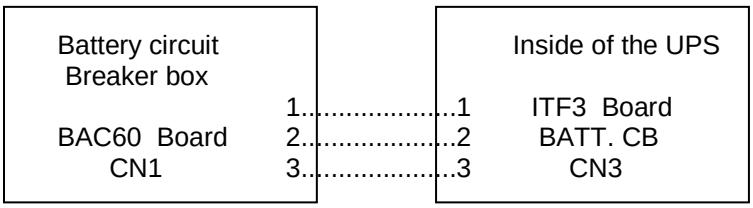
Where battery racks are used, they should be sited and assembled in accordance with the battery manufacturer's recommendations. In general, batteries require a well-ventilated, clean and dry environment at reasonable temperatures to obtain efficient battery operation.

In general a minimum space of 10 mm must be left on all vertical sides of the battery block. A minimum clearance of 20 mm should be allowed between the cell surface and any walls. A clearance of minimum150 mm should be allowed between the top of the cells and the underside of the shelf above (this is necessary for monitoring and servicing the cells). All metal racks and cabinets must be earthed. All live cell connections must be shrouded.

The batteries are connected to the UPS through a circuit breaker (optional), which is manually closed and electronically tripped via the UPS control circuitry. If the batteries are cabinet-mounted this circuit breaker is fitted within the cabinet; however, if the batteries are rack-mounted or otherwise located remote to the main UPS cabinet then the battery circuit breaker must be mounted as near as possible to the batteries themselves, and the power and control cables connected to the UPS using the most direct route possible.

1. Unpack each battery and check its terminal voltage. If any battery has terminal voltage less than 10,5 V it must be charged before continuing.
2. Please check the battery connecting hardware.
3. Please locate 8 pieces of the batteries to each rack.
4. Start locating the batteries from top to the bottom on the racks.
5. Connect the cable between the battery circuit breaker's positive port (BAT+) first then battery tray (+) at the left topside as in the figure 5-5-a-b
6. Connect the cable between the battery circuit's negative port (BAT-) first then battery tray (-) at the right bottom side as in the figure 5-5-a-b
7. Please pay attention to the connections and the poles's directions between the racks.

8. Connect the battery circuit breaker's "UPS(+) ⇒ BATT(+)" and "UPS (-) ⇒ BATT(-)" Ports to the battery group connection terminals at the UPS cabinet.
9. Connect the shielded control cable between the UPS and the battery circuit breaker as in the following.



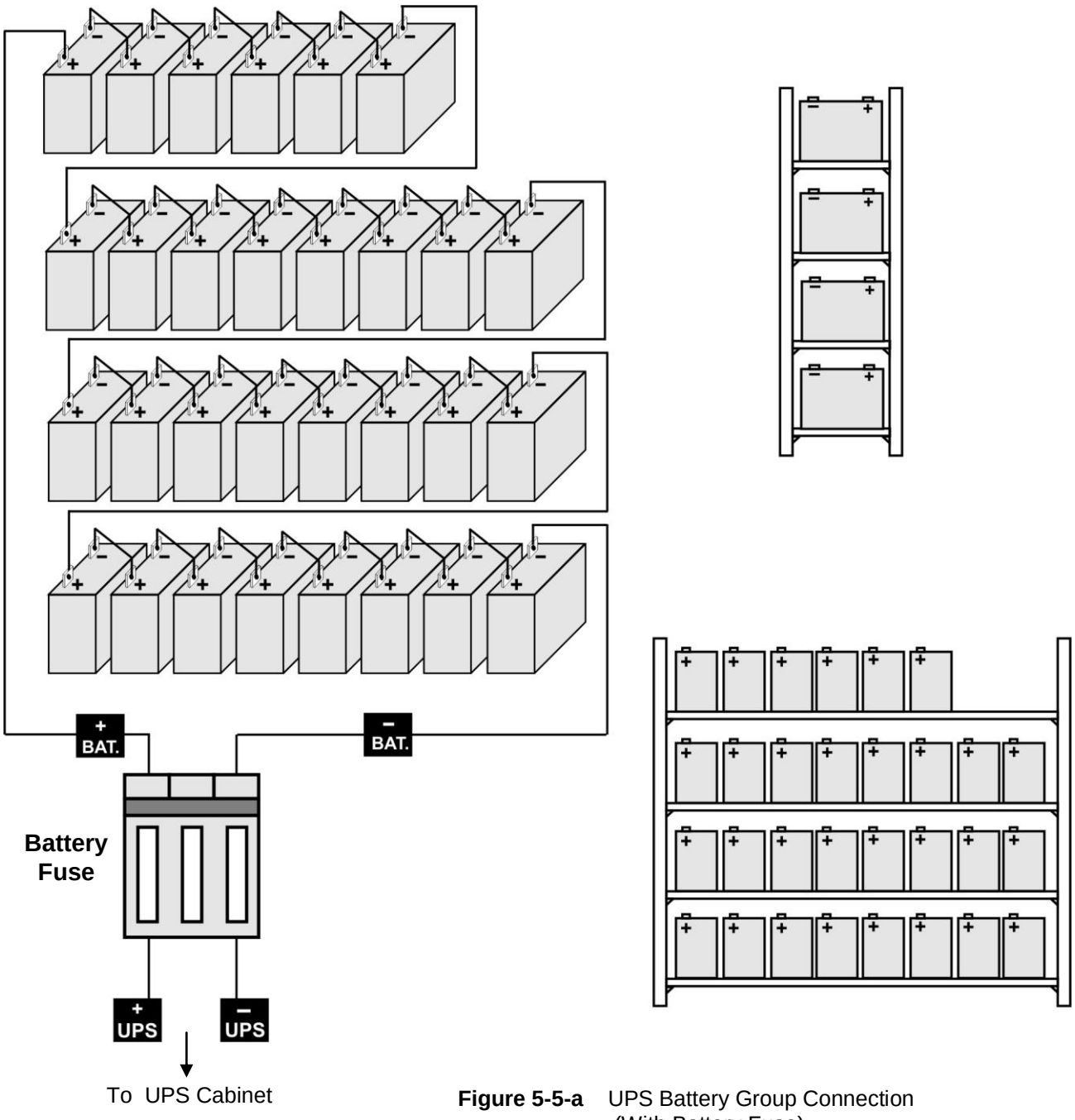


Figure 5-5-a UPS Battery Group Connection
(With Battery Fuse)

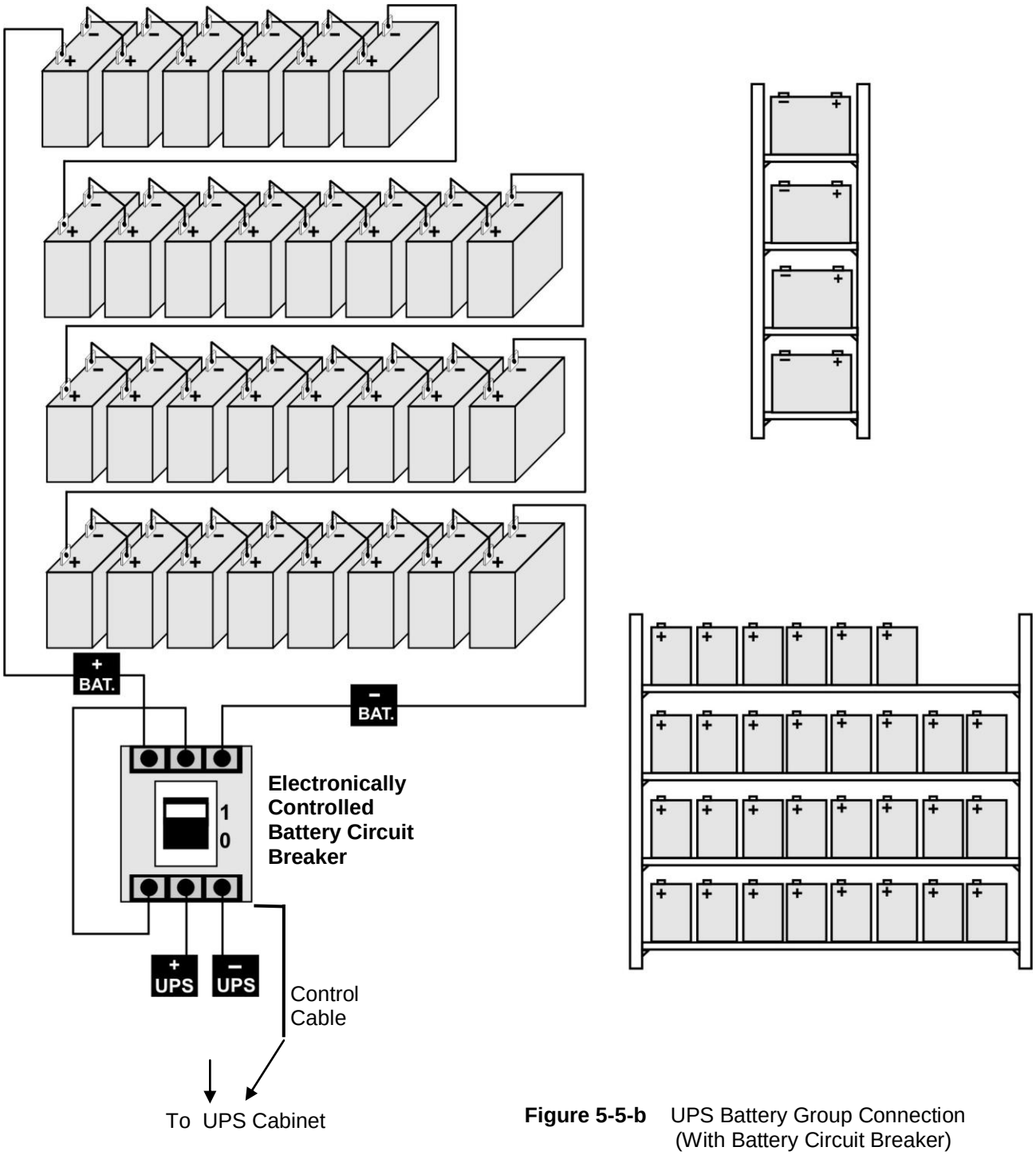


Figure 5-5-b UPS Battery Group Connection
(With Battery Circuit Breaker)

5.4.8 The Communication (UPS-Server)

Dry relay alarm contacts or optional RS232 communication port can be used to inform the user about any possible alarm like “Battery Low” “Line Failure” “Load On By-pass”. The relay interface AS400 and Windows NT is an special edition for the systems.
You should use ITF3 and RS330 board for the communicate with the PC. For this connections there must be a dedicated serial port.

ATTENTION!!! The communication cables of this option must be shielded and must install away from the voltage cables.

The RS232 port (at RS330 board and DB9 female) definition :

RS232 Signal Gnd (isolated)	7
RS232 Receive	6
RS232 Transmit	9

The settings for the Microsoft NT server® , IBM AS400® connections will be done by the system’s operator in accordance to the each user’s needs.

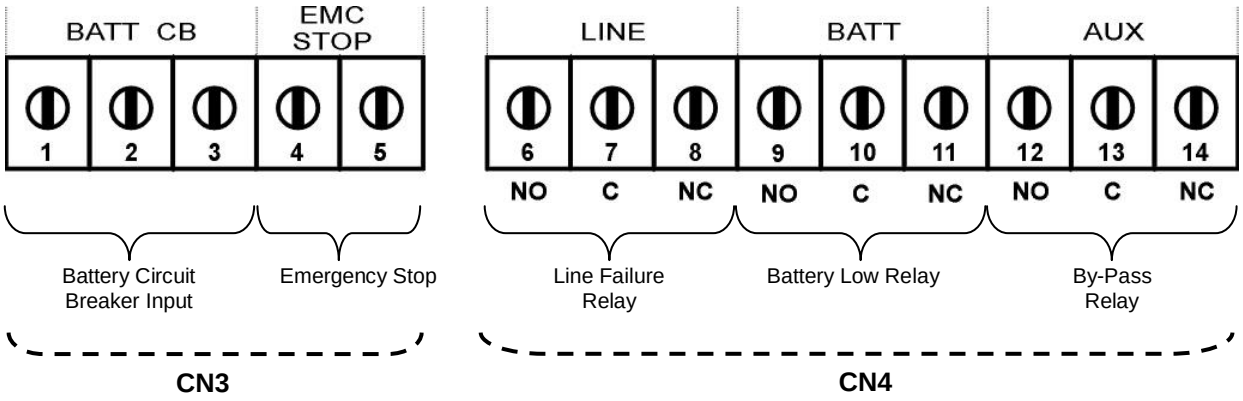


Figure 5-6 ITF3 Board Connection Details

VI . CUSTOMER SERVICE

WARNING!
There are no customer serviceable components inside. DO NOT open the cover or attempt to service the unit. High voltage may remain when the unit is shut down.
Unauthorized service will void the warranty and could cause serious injury.

6.1 Maintenance

The unit is designed for easy maintenance. Very little customer maintenance is required. The following will help to ensure trouble -free operation for several years:

1. Vacuum the dust from the ventilation intake on the front panel.
2. Wipe the cover with a dump cloth.
3. Check the batteries charge with the manual battery test procedure. See Automatic And Manual Battery Test.

CAUTION!
It is recommended to test the battery discharging capability only after the software in use has been saved and all files have been closed.

6.2 Troubleshooting

Due to the unique design, the unit can be serviced only by authorized people. In case of a persistent failure or problem properly turn off the unit first. Then review the following check list. Be prepared to answer the questions before calling the service.

1. Did you follow the operation procedure? Did it happen on installation?
2. Did a power failure occur just after or before the malfunction noted on the UPS?
3. What is the indicators status? (see LCD alarms and FAULT codes)
4. Were any changes made recently to unit or the critical equipment connected to the unit?
5. Did an overload condition occur? Remove load from the unit and restart it.
6. Is the utility power phase sequence correct (were any changes phase sequence of the mains)?

6.3 Storage

1. Check the batteries charge with the manual battery test before storage.
2. Connection's uninstall operation will be done by the authorized service.
3. During the storage period the batteries should be charged once, per six months.
4. Keep the equipment and the batteries in a dry, cool place.
   Best storage temperature for the UPS : Between 0°C and 40°C max.
   Best storage temperature for the batteries : Between 10°C and 35°C max.

VII. REMOTE MONITORING AND CONTROL

Following external connections are available at HP-300 series

- Communication By serial port connection
- Dry contact (interface board) connection
- Remote panel monitoring

7.1 Using Serial Port

A standart Serial communication port is installed to all HP-300 series UPS ,by using this port user can take all information about UPS . All measured parameters ,alarms can monitor by this port. This port is interactive and some commands for UPS is available these commands are listed below.

- Switch to BYPASS
- Switch to INVERTER
- SOUND on/off
- Adjust UPS time and date
- Start SIMULATION mode
- Short BATTERY TEST
- BATTERY TEST until battery low alarm
- CANCEL battery test
- Turn off UPS output voltage immediately (SHUTDOWN)
- Turn off UPS output voltage after delay (WAITING SHUTDOWN)
- Turn off UPS output voltage (SHUTDOWN) and turn on UPS output voltage (WAITING RESTART)
- CANCEL SHUTDOWN
- RENAME UPS

UPS will give response to these commands if the **REMOTE: ENABLE** opsion is selected from **SETTINGS MENU .**

Apply Your local distrubitor, for supply available programs to monitor and control the UPS.

7.2 Serial Communication Cable

The maximum length for RS232 communication cable is 25 meters, cable connector pins are as fallowed :

UPS side	PC side
9 Tx	2 Rx
7 Gnd	5 Gnd
6 Rx	3 Tx

For remote panel – UPS connection this cable is okay.

SERIAL PORT SETUP

BAUD RATE	2400 baud
STOP BIT	1
DATABITS	8 BIT
PARITY	None

7.3 Modem Connection

A HP-300 UPS can be controlled through a normal telephone line by means of a remote operator connected through a PC with modem device, who performs a phone call to the UPS connected number. So the operator can see all parameters and control the UPS (if permitted from SETTINGS MENU).

7.3.1 Hardware Configuration

All needs for modem connection is as follows :

- PC with modem
- WINDOWS 98
- Available UPS control software
- DUMP modem which is connected to UPS

In order to perform this function a PC with UPS control software and an external or internal modem device connected to telephone line are needed.

A standart modem device, configured according to DUMP and auto answer modes, will be installed on the UPS and, once programmed, will following a telephone call of the PC-embedded modem ,connect the UPS to the telephone line.

7.3.2 Functioning Principle

The remote operator, by means of a PC and a modem device and using the remote connection function of the control software, calls the UPS through the number to which this is connected.
The dumb modem device, connected to the UPS, will answer the call and convert the data coming from UPS serial on the telephone line. This way all measures and controls allowed by the RS232 serial port can be carried out.

7.3.3 SMART Modem Programming (PC modem)

The connected modem to PC (smart modem) will be programmed from UPS control software automaticly.

B0 E1 F1 M1 Q0 V1 X3
BAUD = 2400 PARITY = N WORDLEN = 8
DIAL = TONE

&A3 &B1 &C1 &D0 &H1 &I0 &K1 &M4
&N0 &R2 &S0 &T5 &Y1

7.3.4 DUMB Modem Programming

The connected modem to UPS can be program from COMMAND MENU ,ENTER :MODEM INIT automaticly.
But the user can program this modem from a PC by following options.

B0 E1 F1 M1 Q0 V1 X3
BAUD = 2400 PARITY = N WORDLEN = 8
DIAL = TONE

&A3 &B1 &C1 &D0 &H1 &I0 &K1 &M4
&N0 &R2 &S0 &T5 &Y1

7.3.5 DUMB Modem –UPS Connection Cable

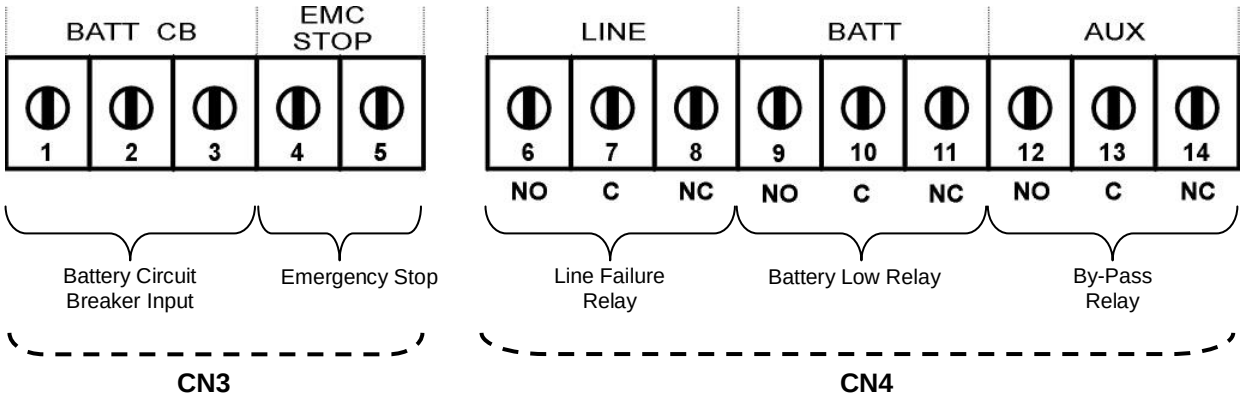
The connection cable between dumb modem and UPS is as followed:

UPS DB9 female	MODEM DB25 male
6	3
7	7
9	2

7.4 Dry Contact (Interface) Connection

Some important events can be monitored by this connection for each event a relay is located on interface board and NC-C-NO contacts are connected terminals .
these events are:

- LINE FAILURE
- BATTERY LOW
- LOAD ON BYPASS
- BATTERY CB input
- BATTERY CB output
- EMERGENCY STOP input



7.7 Remote Monitoring Panel

Remote monitoring panel can be used from 400 meters away from UPS. Up to 25 meters there is no need extra hardware RS232 communication is okay. But if distance is longer than 25 meters extra RS485 hardware is needed.

Up to 5 remote monitoring panel can be used in system.

VIII. LIMITED WARRANTY

The UPS is warranted against all defects in workmanship and materials under normal use for a period of one **( ) year** from the date of shipment to the original user. The conditions of this warranty and the extent of responsibility of

……

corporation under this warranty are as follows.

1. The warranty does not apply if the product has been subjected to physical abuse, improper installation, unauthorized service or modification.

2. The sole responsibility of

……

corporation under this warranty shall be limited to the repair or replacement of the product, at the sole discretion of

……

corporation.

3. If it becomes necessary to send a defecting unit to

……

corporation, the product should be shipped in its original carton or in suitable equivalent, and with shipping charges prepaid.

……

corporation will not assume any responsibility for any loss damage incurred in shipping.

AGKK3255 02/2008